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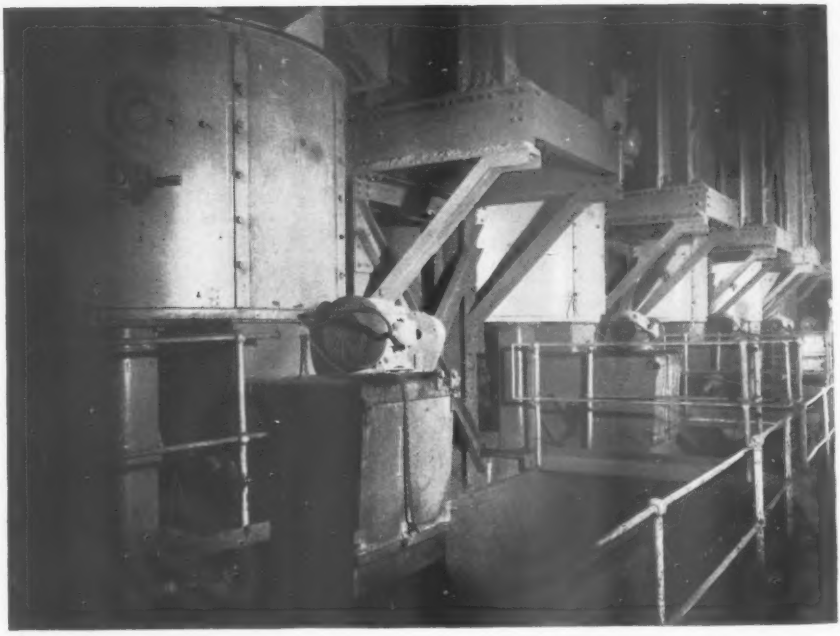

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FOUNDRY
TRADE JOURNAL

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Foundry Practice for Engineering Graduates

In a Report on Practical Training recently issued by a committee appointed by the Institution of Mechanical Engineers, Mr. H. G. Conway, the chairman, expressed his regret that he never had had even a few weeks' practical experience of foundrywork, and in general terms he regretted this. It can be assumed that this gap in practical training adversely affects the design of castings from a foundry point of view.

We recently visited an Arts et Métiers Engineering School at Aix en Provence in connection with the annual congress of the *Association Technique de Fonderie*. It is one of five similarly equipped colleges existing in France, where for three years students working for an engineering technological diploma spend three years, terminating with a fourth year at the Paris central establishment, which receives the students from the five provincial ones and here, stress is laid upon the more theoretical aspects of their training. The claim is made that this group of colleges is unique throughout the world as providing for " Ingenieurs " a thoroughly practical training. The school at Aix is a veritable full-scale works replete with drawing offices, patternshop, foundry, machine and welding shops, power stations and so forth. The scope can be envisaged by the statement that the foundry will be about 50 to 60-ft. wide and 100-ft. or so long. It is spanned by a couple of 5-ton overhead-travelling cranes. There are two 1-ton per hour cupolas, a works-size brass melting plant, a couple of die-casting machines. There is a modern automatic sand-preparing plant and a rotary table shotblasting machine, by a famous French maker. Moulds are made by hand or on five or six moulding machines. We saw quite a few machine tools and medium-sized engines which had been built by the students, who do the actual patternmaking, moulding, coremaking, machining and erecting. There are available competent instructors, but no skilled artisans, and a few labourers.

In the patternshop, which is particularly well equipped and includes some machinery from Leicester, patterns for strickling, for hand and machine moulding, including some metal ones, were being made. Whilst the shop equalled in size and possibly surpassed in equipment the one seen in Paris during the visit by the National Society of Master Patternmakers, the latter being for the training of craftsmen, turned out more complicated and better finished work. It must be remembered that the school at Aix is for the training of technologists and not craftsmen. Not all the great engineering schools in France have such a practical training as the group of Arts et Métiers, but the former resemble our Universities. Now that technical training is being revolutionized in this country, the educationalists would do well carefully to study what is being done by this special group of schools in France.

Dinners

INSTITUTE OF METALS

The Jubilee dinner of the Institute of Metals was held last Thursday night at Grosvenor House. Marshal of the Royal Air Force Lord Tedder, president, was in the chair, and the principal guest was Viscount Hailsham, Q.C. (Lord President), who was accompanied by Viscountess Hailsham. Among those present were:—

The Belgian Ambassador, the Spanish Ambassador, the Deputy High Commissioner for the Federation of Rhodesia and Nyasaland, the Deputy High Commissioner for Australia, Baron G. de Juniac, Mr. E. A. Kekich, Mr. H. Leslie Brown, Marshal of the Royal Air Force Viscount Portal of Hungerford, Air Vice-Marshal Sir Paul Maltby, Sir Harry Jephcott, Sir John Cockcroft, Sir Lawrence Bragg, Sir Christopher Hinton, the Hon. John Grimston, M.P., Dr. Maurice Cook, Mr. G. L. Bailey (senior vice-president), Dr. N. P. Inglis (vice-president), Mr. R. D. Hamer (vice-president), Mr. H. G. Herrington, and the presidents of British and foreign allied metallurgical societies.

On the previous Tuesday, the Institute held a reception in the Livery Hall of the Worshipful Company of Fishmongers, at London Bridge, when the then president-elect, Marshal of the Royal Air Force the Lord Tedder, G.C.B., D.C.L., LL.D., received the guests, who were later entertained to champagne and cocktails and buffet refreshment in this unique and historical setting.

NATIONAL SOCIETY OF MASTER PATTERNMAKERS

The fourth annual dinner of the National Society of Master Patternmakers was held last Friday in the Burleigh Suite of the Strand Palace Hotel, the president, Mr. N. Gott, was in the chair. The toasts were proposed by Mr. B. Levy and Mr. W. D. Hartley and responded to by the president and Mr. B. McCarty, director of the Engineering and Allied Employers National Federation. Others at the high table were Mr. L. Brown and Mr. V. C. Faulkner and the wives of the speakers and guests. The proceedings were governed by the honorary toastmaster, Mr. W. Smith. After dinner, the members and their guests danced to the music supplied by Wally Smith and his orchestra, with Jeannette Coleman as the vocalist.

Sales Conference at John Harpers

At the sales conference which is being held next week by John Harper & Company, Limited, Albion Works, Willenhall, the following papers will be presented: "Some Aspects of Purchasing Procedure," by Mr. P. T. Appleby, the company's purchasing agent who is a past-president of the Purchasing Officers' Association; "Industrial Conditions in the USA," by Mr. J. D. Harper, who has recently joined the concern. After getting an honours science degree at Cambridge, he spent some time in the works of Castings, Limited, Coneygre Foundry, De Globe Foundry in Holland, and the Hamilton Foundry & Machine Company in the USA, where he visited many other plants. Mr. D. H. Middleton, the development manager, is giving a paper on "Industrial Design" and finally, Mr. J. Dews, the chief metallurgist, is to talk on "Recent Developments in High-duty Iron."

TUBE INVESTMENTS, LIMITED—Mr. A. J. S. Aston and Mr. R. D. Young have been appointed to the board.

Financing of Advanced Sandwich Courses

Since the White Paper on Technical Education was published in February, 1956, the number of advanced sandwich courses, under which students spend part of the year in a technical college and part in industry, has increased from 100 to over 200, and the number of students taking them from 2,000-3,000 to 5,000-6,000. The objective is to raise the number of students to 15,000-20,000, and so contribute to the building up of the supply of technologists which the country needs. With a view to stimulating the spread of these courses, particularly among medium-size and small firms, the Ministry of Education and the Federation of British Industries have been reviewing the arrangements for giving financial assistance to students who wish to take them.

The Federation of British Industries, in a policy statement issued last week to all members, states its belief that industry, by enabling selected employees to pursue advanced sandwich courses, in addition, to supporting day release schemes, acts in its own as well as in the nation's interest. The Federation recommends to its members that firms which already pay their students' fees and salaries should continue to do so, and expresses the hope that firms sending students on advanced sandwich courses in the future will follow this example, since it stimulates the student's sense of loyalty to the firm and strengthens the firm's ties with the college. Such payments are treated as normal business expenses for tax purposes.

The Ministry and the Federation recognize, however, that there are and will continue to be firms who do not feel able to meet the whole cost of such training. There will, therefore, be a continuing number of such students who will look to local education authorities for aid. In a memorandum, Mr. Geoffrey Lloyd, the Minister of Education, recommends local educational authorities to give sympathetic consideration to such applications.

Import Duties on Iron and Steel

A new Import Duties Order, entitled The Additional Import Duties (No. 3) Order, 1958, came into operation on April 28. The Order, which implements the agreement with the European Coal and Steel Community signed last November, has the effect of reducing the United Kingdom import duties on the main crude and semi-finished products of iron and steel and certain forms of finished steel to 10 per cent. *ad valorem*, with appropriate adjustments to the alternative specific rates of duty. The suspension of duty on certain products until September 18, 1958, will not be affected. Copies of the Order (S.I. 1958 No. 671) may be obtained from Her Majesty's Stationery Office or from any bookseller, price 3d. (by post 5d.).

Birmingham Designers see Industrial Films

At a recent meeting of the Midland branch of the Institution of Engineering Designers in Birmingham, members saw two films on "The Flame Hardening Process" and "Advances in Oxy-Acetylene Welding Techniques." The films were provided by British Oxygen Gases, Limited, and a company representative answered questions after the showing. The film on flame hardening illustrates how the process can be used on cash-register components, starter rings for automobiles, piston-ring grooves for ships' diesel engines, tractor sprockets and gun-turret rings on military tanks, and on the internal walls of pipes used in the mining industry.

New Methods for Bath Production at Greenford

British Bath Company completely change Layout, Plant and Equipment

Following the account in last week's issue of the JOURNAL *where a new bath foundry in the Midlands was dealt with, it is interesting to make comparisons with the following account of the complete reorganization of bath founding at the Greenford, London, works of British Bath Company, Limited (one of the Allied Ironfounders group of companies). The two plants are similar in that jolt ramming by US-built Herman moulding machines (supplied by Pneulec, Limited) has been adopted in both for the first time in this country, in preference to slinger production of moulds. In both foundries, the moulding has been integrated with automatic mould assembly, conveyorized operation and elaborate sand-reconditioning plant. Here the similarities end. The Midlands' foundry started with a virgin site and installed virtually the whole plant under one roof, whereas at the Greenford foundry, existing bath production on the site had to be continued, and melting, moulding and sand treatment to all intents and purposes are housed separately. One foundry uses cold-blast and the other—British Bath Company—hot-blast cupolas. These and other points of contrast have a number of pertinent implications for the serious student of foundry layout and practice.*

Allied Ironfounders, Limited, claimed now to be the largest bath maufacturing company in Europe, have recently completed the installation of a new automatic plant for the manufacture of bath castings at the British Bath Company's works in Greenford, London. It employs jolt-ramming for mould production for the first time as part of a fully-mechanized and integrated sequence of moulding, casting, knockout and sand re-treatment.

Historically it is germane to record here that bath-castings production at Greenford started 32 years ago, when the original directors of Light Castings, Limited (later, Allied Ironfounders, Limited) developed the scheme for making cast-iron baths on a specialized plant in the London area, displaying considerable courage and vision in deciding on slinger (or impeller-type sand rammer) as the vehicle of mould production. Before this, practically every attempt in the UK to make baths by tractor-type slinger had been abandoned, for a variety of reasons, and manufacture in this country generally had reverted to the older and established hand-moulding methods; no doubt one of the main reasons for failing to persevere was the plentiful labour supply usually available in the established bath-making centres.

At Greenford, however, there was no reserve of seasoned labour and no alternative method of manufacture ready to hand, so the management had to adapt the slinger to the job and the project eventually met with success. From 1929, the management finally built up an output of from 500 baths to 2,000 per week in 1936, the latter, based on the introduction of three stationary impeller rammers with appropriate sand plant. This was expanded later, in post-war years, by the introduction of further mechanized sand-treatment and the employment of double-shift operation of moulding teams concentrated about stationary high-speed slingers. For this production, between 600 and 700 tons of metal were melted weekly, in cold-blast cupolas.

Basic Layout

The latest plant (formally opened only last week), being installed within the existing foundry building, presented many engineering and foundry problems, as full production from the existing plant was maintained during the excavation and construction of the extensive foundations and during installation of the new machinery. The layout of the plant is shown in Fig. 1. It comprises two 14 to 18 tons per hr. hot-blast cupolas, (1) and (2), with a single recuperative installation (3), to pre-heat the combustion air. The molten metal from the cupolas is distributed to the mould-pouring stations in insulated ladles (4), suspended from travelling cubicles electrically driven and carried telpher-wise on a monorail.

Two Herman moulding machines (Nos. 1 and 2, Fig. 2) one for the cope part-mould and the other for the drag part-mould are installed with a "U"-shaped power-driven roller-conveyor track (3). The moulding machines each have two stations indexing alternatively between jolting and stripping. The plant for preparation and distribution of the moulding sand is installed in two detached buildings interconnected by covered walkways over the sand conveyor belts. The plant is designed for the production of the standard baths marketed by the company, ranging from the old-fashioned rounded-end bath to the "Vogue," a modern registered design of rectangular-top bath recently introduced by the firm. These baths (grey-iron castings) are subsequently porcelain enamelled in white and in a standard range of colours.

As explained earlier, improvement in the production methods in the iron foundry have continuously advanced in an effort to reduce the heavy manual work involved in manufacturing castings. Prior to the introduction of sand-handling plants, the moulding sand and the mould were prepared by the skilled

Bath Production at Greenford

moulders. This work involved the manual shovelling of many tons of sand for each casting produced. The plant, which is now described, permits bath moulds and castings to be produced in large quantities by unskilled labour operating push-button controls.

Hot-blast Cupolas

The layout of the metal melting department illustrated in Figs. 1, 3, 4 and 5, comprises two cupolas (1) and (2) operating on alternate days in conjunction with a recuperative hot-blast installation, the whole being to designs of Cupodel, Limited, in co-operation with Keith Blackman, Limited. The cupola shells 5-ft. 6-in. dia. are water-cooled at the melting zone and are fitted with wet-type spark-arresters to minimize the emission of fume and grit to the atmosphere. The melting conditions, the composition of and weight of the materials charged and the analysis of the molten metal are accurately controlled and recorded.

Charging

An overhead electric travelling crane, Fig 1 (6) spans the stockyard into which the raw materials are delivered by rail and road transport. The pig-iron and scrap are unloaded by electromagnet (10), and stacked around an open-topped batch weigh-hopper (7). The latter is suspended on a system of levers connected to a dial indicating and recording weighing machine (8). A duplicate dial (9), electronically connected to the master dial, is mounted within the vision of the crane driver, enabling the operator accurately to control the weight of material released from the magnet. Each constituent of the charge is accurately weighed and the weight automatically recorded and printed on to a continuous-paper roll against a coded number. From these records an analysis of the materials charged and the accuracy of charge computation is compiled and transferred for costing purposes.

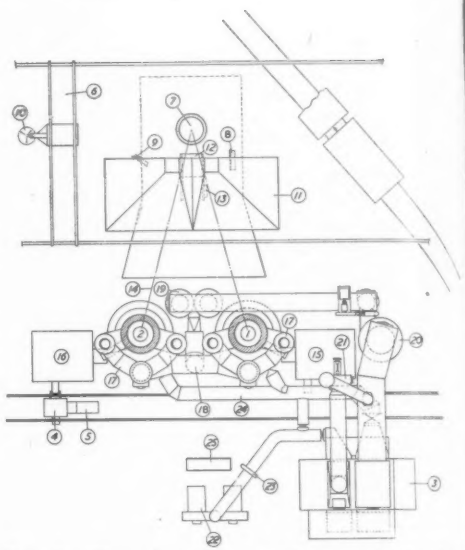
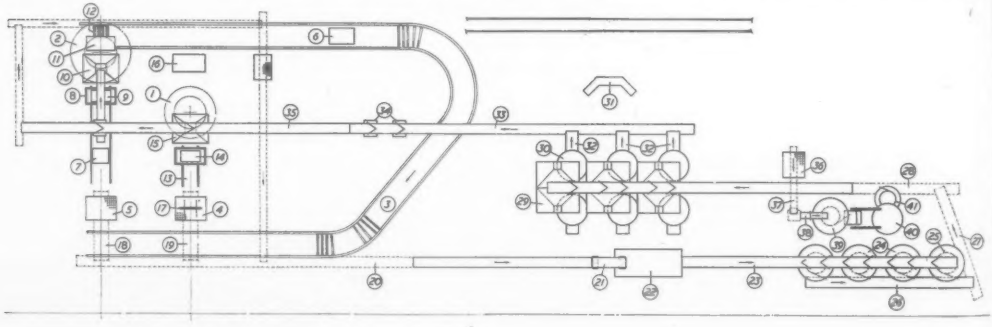


FIG. 1.—*Plan view of part of the revised scheme for bath castings production at the Greenford plant. This section mainly covers stockyard, melting and metal-distribution facilities.*

Key : (1) No. 1 hot-blast cupola; (2) No. 2 hot-blast cupola; (3) recuperator; (4) metal-distribution ladle; (5) metal-distribution carriage; (6) yard crane; (7) weigh hopper; (8) weighing machine; (9) "slave" dial; (10) magnet; (11) coke hopper; (12) coke batch hopper; (13) coke-weighing machine; (14) charger; (15) No. 1 receiver; (16) No. 2 receiver; (17) gas offtakes; (18) dust collector; (19) cyclones; (20) combustion chamber; (21) exhaust fan; (22) cold-blast fan; (23) air/weight control valve; (24) hot-blast main, and (25) instrument panel.

FIG. 2.—*Plan of the moulding and sand-treatment sections of the new British Bath layout.*

Key : (1) Cope moulding machine; (2) drag moulding machine; (3) power-driven mould-conveyor; (4) cope (vibratory) shakeout; (5) drag (vibratory) shakeout; (6) moulding boxes; (7) inclined box-conveyor; (8) drag lifting-frame; (9) drag batch-hopper; (10) main storage hopper; (11) ramming weights; (12) stripping table; (13) cope carriage; (14) cope batch-hopper; (15) main storage hopper (No. 2); (16) coring stand; (17) cope grab at shakeout; (18) drag apron-conveyor; (19) cope apron-conveyor; (20) No. 1 belt conveyor; (21) overband magnet; (22) rotary screen; (23) No. 2 belt conveyor; (24) storage hoppers; (25) rotary feed-tables; (26) No. 3 belt conveyor; (27) No. 4 belt conveyor; (28) No. 5 belt conveyor; (29) storage hoppers; (30) sand mills; (31) control panel; (32) Nos. 6, 7 & 8 feeder belts; (33) No. 9 belt conveyor; (34) aerators; (35) No. 10 belt conveyors; (36) new-sand floor grid; (37) conveyor belt; (38) elevator; (39) storage hopper; (40) sand mill, and (41) rotary table.



The coke and limestone are stored in overhead storage hoppers (11), each arranged with an electrically-vibrated feeder under the hopper outlet. The feeders discharge coke and limestone into a travelling batch-hopper (12). The hopper is suspended on levers interconnected to a dial-indicating weighing-machine (13). Electrical cut-out cams within the dial are set to the predetermined weight for the coke and limestone required. A push-button control starts the cycle, each feeder discharging in turn the correct weight of material into the batch hopper. The loaded hopper then travels over the main weigh-hopper and discharges the coke and limestone into it.

The cupolas are mechanically charged by an inclined swivel charger (14) furnished by Incandescent Heat Company, Limited. The latter is pivoted centrally between the cupolas under the main weigh-hopper. The charger is rotated daily to align either cupola No. 1 or 2 with the weigh hopper (7). The charging bucket of 40 cub. ft. capacity is fitted with double-leaf bottom-discharge doors arranged to open automatically when the bucket is within the cupola and to close when the bucket descends under the weigh hopper.

The nominal melting rate for each cupola is 14 tons per hour and metal temperatures of up to 1,600 deg. C. have been obtained. The metal is tapped continuously from the cupola through a slag box into a metal receiver of 3 tons capacity (15) and (16) (and Fig. 6). The receivers are fitted with oil-fired burners for drying and pre-heating the refractory lining. They are mechanically rotated to discharge the molten metal into lip-axis pouring ladles (4). The latter are mounted in electrically-driven telphers (5) for distributing the metal to the pouring stations within the foundry.

Hot-blast Recuperator

The economic advantages of hot-blast cupolas compared with those employing cold blast are becoming generally known in the foundry industry. In the hot-blast plant installed at Greenford the combustion air is pre-heated by the waste gases extracted from the cupola stock. The chemical reactions between the air and coke are different from when cold blast is used, increasing the combustion temperature and reducing the metallic losses by oxidation within the cupola.

The waste gases containing carbon monoxide are withdrawn through ports (17), below the charging door. These gases pass through primary dust-collectors (18), and cyclones (19), in which the heavy dust and grit particles are collected and deposited in hoppers. The gases are then passed through insulated ducts to a cylindrical combustion chamber (20). Combustion air is introduced, burning the carbon monoxide within the combustion chamber. From the combustion chamber, the gases pass through a recuperator (3) (and Fig. 4), in which they heat the outer surfaces of four banks of horizontal tubes, through which the cupola blast air is passing. The gases having given up most of their heat are drawn from the recuperator by a centrifugal fan (21), through a control damper, and discharged into the upper portion of the cupola stack below the spark-arrester.

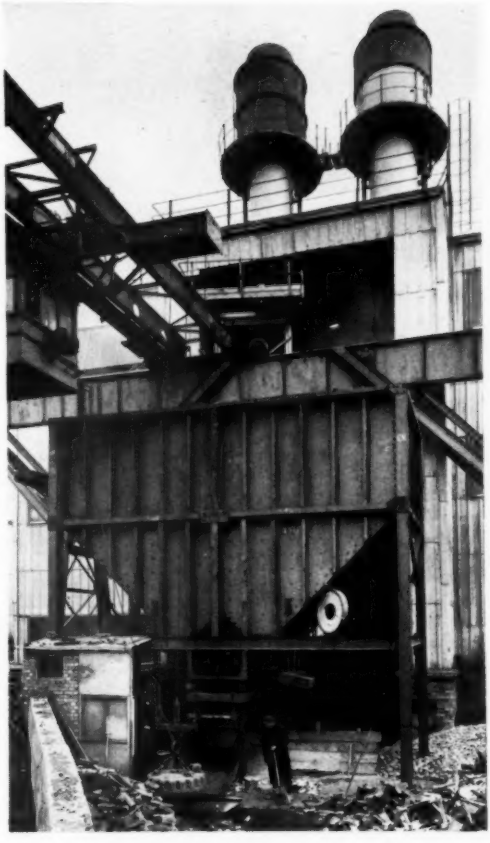


FIG. 3.—*General view of a portion of the stock-yard, showing part of the overhead electric gantry crane, coke hopper and hot-blast cupolas.*

The cupola blast air is led from the cold-blast fan (22), through an automatic air/weight control valve (23), into the recuperator itself, flowing through the interior of the heated tubes increasing and controlling the temperature at 500 deg. C. The pre-heated air then passes through the hot blast main (24), into the cupola tuyeres. Instruments (25), for indicating and recording temperatures, pressures and flow and the automatic controls for the operational valves are located in a central panel.

Mechanical shot-cleaning of the recuperator tubes has quite recently been installed to remove dust and maintain maximum thermal efficiency of the hot-blast plant. In this equipment, metallic shot is distributed over the upper banks of the recuperator tubes and in falling through the lower rows dislodges the dust. The shot is collected at the base of the recuperator and recirculated.

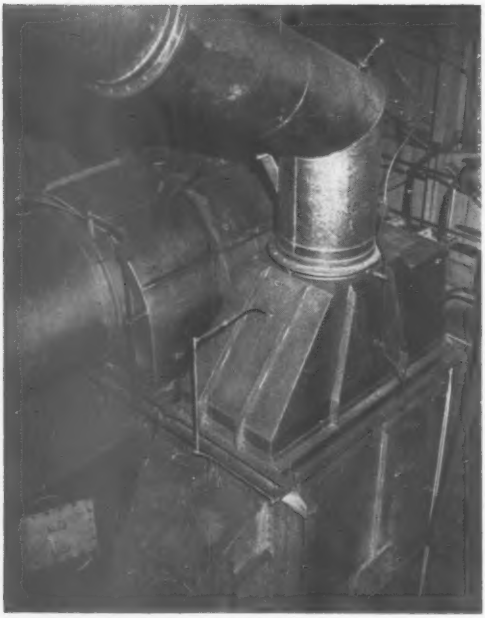


FIG. 4.—*Recuperator gas-inlet and -outlet connections for the hot-blast cupolas.*

Water-circulating Plant

Water is drawn from a local canal and pumped to duplex cooling and recirculating tanks serving the cupolas. Motor-driven centrifugal pumps circulate water from the tanks to the furnace melting-zone water-jacket, the spark-arresters and the exhaust-fan bearings. The water and the sludge from the spark-arrester is filtered and returned to the cooling tank for recirculation. A similar pump returns a controlled volume of water to the canal to keep the water in the system within predetermined limits of acidity and temperature.

Orifice plates fitted in the flow and return pipes are connected to indicating and recording flowmeters installed in the pump-house. The pumping plant is automatic in operation, controlled by the float switch fitted in the water tanks. An alternative water supply from the mains is connected to the circulating pipes and comes into operation automatically, should the water pressure fall below a pre-set limit.

Sand Preparation and Distribution

The sand-preparation and -distribution plant (Figs. 7 to 10) supplying the jolt moulding plant is housed in two new buildings interconnected to the foundry and each other by covered walkways over the conveyor belts. Used sand discharged through the drag and cope vibratory shakeouts (4) and (5) Fig. 2, is collected in "V"-shaped hoppers and conveyed on apron conveyors (18) and (19), to an inclined belt-conveyor (20). An Overband magnet (21) (and Fig. 7), in line with conveyor belt (20), is fitted over the head pulley of this conveyor to remove any tramp iron from the moulding sand.

The sand discharged over the head pulley passes into and through a large rotary screen (22) on to a second inclined belt-conveyor (23), feeding the sand into four independent storage-hoppers (24) (and Figs. 8 and 9). The ploughs, two over each hopper, are automatically operated through a central instrument panel (Fig. 10) by means of high- and low-level electronic probes fitted within each hopper. Indicator lights on a visual panel indicate to the operator the contents of each hopper. The ploughs automatically lift when the hopper is full and lower when the hopper approaches the pre-set low level, thus refilling the hopper.

Rotary feed-tables (25), independently controlled from the central station, are fitted under each storage hopper. The sand discharged from the rotating tables is collected on a horizontal feeder-belt conveyor (26), and fed by additional conveyor-belts (27) and (28), to six overhead storage-hoppers (29), one over each sand mill. These hoppers are also fitted with high- and low-level electronic probes, interconnected to the indicator lights on the visual panel to the control station and to the sand ploughs.

Independent batch hoppers of 4,000-lb. capacity each are suspended under the outlet of each storage hopper. Electronic high-level probes installed in the batch hopper operate the hopper gates through solenoid valves and accurately control the batch volume.

Milling

The batch hoppers discharge the sand into each of six August-Simpson No. 3F sand mills (30). The latter are controlled by push-button from the central control desk—indicator lights on the control desk are illuminated while the mills are in operation. The sand-preparation and milling operations are all automatically controlled by three self-contained control panels (31), each controlling two sand mills. Automatic timing-switches control the milling cycle and the volume of water added to each batch. The remaining operations are controlled in a pre-determined sequence by rotary cams driven through synchronous motors and gearboxes.

The sand is discharged from each sand mill through duplex doors on to three feeder-belts (32), one under each pair of mills. These belts feed the sand in an even stream on to an inclined belt-conveyor (33). The latter discharges the sand through two sand aerators (34) on to the main conveyor belt (35), feeding each storage hopper (10), and (15), over the two jolt moulding machines (1) and (2).

The sand ploughs on the conveyor belts feeding the storage hoppers are automatically controlled by electronic probes. Surplus sand—if the machine-hopper ploughs are in the elevated position—is passed by belts back to the return conveyor-belt adjacent to the shakeouts.

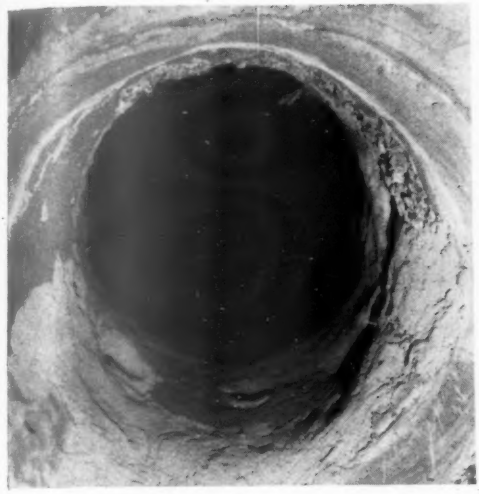


FIG. 5.—*View of the interior of the cupola looking up the stack. The tuyeres can be seen below the quite shallow burn-back of the lining.*

New sand is discharged from tipping vehicles on to a floor grid (36) and collected in an underground hopper. A conveyor belt (37) and elevator (38) feed the sand into an overhead storage hopper (39). The new sand is prepared in another No. 3F sand mill (40) and discharged into a feed hopper and rotary table (41). In this way a light (predetermined) covering of new sand is fed into the returned sand as it passes to the storage hopper over the sand-milling plant.

Moulding

The area occupied by the moulding plant is approximately 200 by 80 ft. The system produces 55 to 60 moulds per hour with a team of about 20 men. The bath moulds are rammed with synthetic sand in cast-steel two-part moulding boxes; these boxes are accurately machined on the joint faces, jig-drilled and bushed for the locating pins. Close tolerances on the mating surfaces of the pins and bushes are maintained to eliminate box shifts and avoid uneven thickness in the walls of the castings.

The moulding plant, illustrated diagramatically in Fig. 2, consists—as mentioned earlier—of a pair of two-station indexing jolt moulding machines (1) and (2) of robust construction and arranged with automatic controls. The moulds travel from the moulding stations on a power-driven roller conveyor (3) to the pouring station, then through a cooling tunnel to the vibratory shakeouts (4) and (5). Mechanical-handling equipment, automatically controlled, is installed to handle the quite heavy boxes and moulds.

The flow of the sand, moulds, moulding boxes and castings is indicated in Fig. 2. The empty drag moulding-box (6), after removal from the shakeout (5) is lowered on to and located on a carriage travelling on an inclined track (7) which moves and raises the moulding box to the loading station at the rear of the drag moulding-machine.

Drag Mould

The drag moulding-machine (2) comprises three units—a heavy pneumatic jolting machine-table 72 by 48 in., an indexing turret supporting two bath patterns which rotates through 180 deg. during the index cycle (so that alternate patterns seat on the jolting table) and an automatic mould-stripping machine is installed diametrically opposite to the jolt machine. A moulding box is picked up from the carriage on the inclined conveyor by a lifting-frame (8), and moved into position over the jolt table where the batch hopper (9) is automatically filled with sand from a main storage hopper (10). The box is lowered on to the pattern after the machine has indexed into position. Pressing a button serves automatically to clamp the box to the pattern and discharges the sand from the batch-hopper into the moulding box.

The jolting operation—time controlled and of approximately 5-sec. duration—is also started by push button. Simultaneous with this operation, the box lifting-frame (8), is returned into position over the inclined conveyor (7) to pick up the next

FIG. 6.—*Metal-distribution crane, with molten-metal receiver in the foreground. The pouring ladle is actually behind the operator's cab carried on the telpher suspension (top, left).*

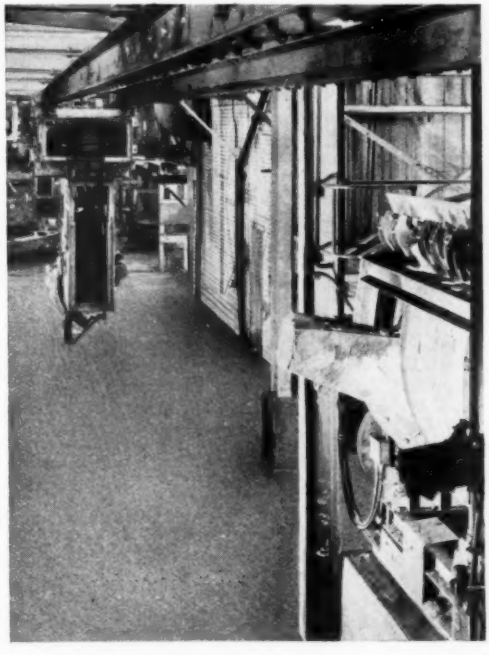


FIG. 7.—*Inclined sand-conveyor belt, with Overband electro-magnet to remove tramp iron from the sand.*

moulding box (6). Next, the ramming weights (11) automatically move into position over the jolt station and the jolting is momentarily stopped as the weights lower into spaces between the moulding-box bars and is then resumed to consolidate the sand on the upper surface of the drag mould.

After a second jolting operation, requiring approximately 10 to 12 sec., the ramming weights are elevated to allow indexing to commence. The operator actuates the rammed mould to the stripping station (Fig. 11) and placing the other pattern into position on the jolt table ready to receive the following box.

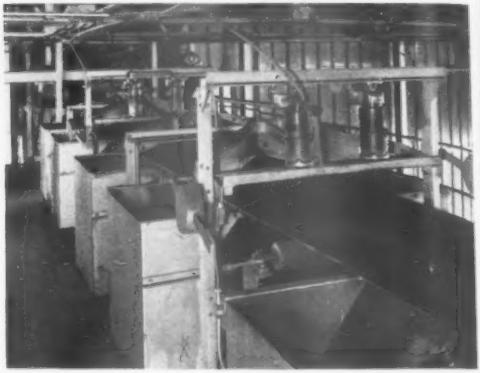
The drag mould, rammed in the inverted position, is automatically rolled over during the indexing operation. The roller-topped stripping table (12) is automatically elevated into position during the indexing cycle ready to receive the mould as it is withdrawn from the pattern and lowered on to the surface of the power-driven conveyor rollers.

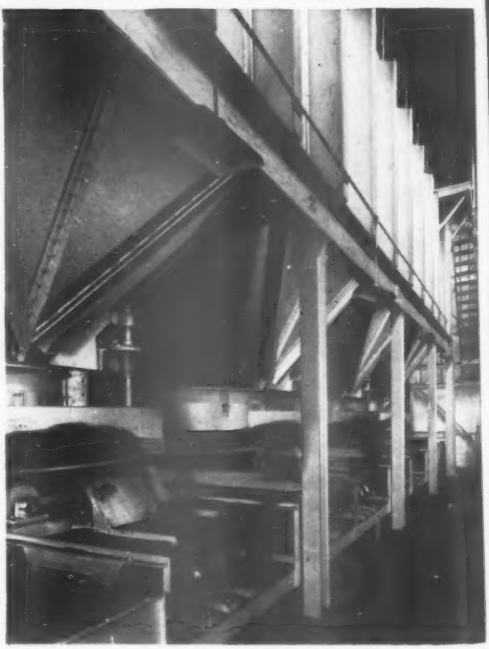
Electrical controls are operated by the moulding box as it moves on the conveyor towards the closing station, releasing the interlocks and allowing the pattern to rotate back into position and re-index.

Cope Mould

The cope moulding-machine (1) also comprises three units—the jolt machine, the index turret with two patterns and a pin-lift stripping machine. A cope moulding-box is first gripped by twin grab-arms, pivoted on a lifting beam, traversed and lowered on to a carriage (13) on which it is accurately loaded. Next, the moulding box is picked up from the carriage and moved into position over the pattern on the jolt table during the index cycle. Operators set the sprue-formers and operate a push-button to fill the batch hopper (14) with sand from the main storage hopper (15). A push-button

FIG. 8 (ABOVE).—*Sand conveyor-belt feeding the storage hoppers. The sand ploughs, controlled by high- and low-level probes within the hopper, operate automatically.* FIG. 9 (BELOW).—*Sand is withdrawn from the base of the storage hoppers by rotating feed tables. The belt conveyor in the foreground collects the sand from each table.*





also lowers and clamps the moulding box to the pattern and discharges sand into the box. Formers for the pouring basins are positioned and the time-controlled jolting-switch is operated—being jolted for approximately 10 to 12 sec. The head- and sprue-formers are then removed and the machine is indexed; the completed mould is raised off the pattern by the stripping pins and removed to a coring stand (16). During this period the next mould is being rammed at the jolt station.

Finally, the cope mould is inspected and the four cores for the foot-anchorage lugs of the bath are inserted. The mould is then moved into line with the drag mould on the conveyor and lowered over the guide pins, closed and clamped. As one completed mould travels from the closing station, other drag and cope mould halves move into position for closing.

Mould Conveyor and Knockouts

The power-driven mould-conveyor (3) is approximately 250 ft. long, each section being independently driven, giving greater flexibility than a conventional pallet conveyor. The rollers, 6-ft. long and 5-in. o.d. revolve in heavy-duty roller-bearing plummer-blocks, supported on a heavy steel-framed structure. The rate of travel is variable and is adjusted so that the ingates solidify as the mould moves from the pouring station to the cope shakeout position.

In knocking out, the cope mould is first gripped by remotely-operated grab-arms (17), engaging with inverted "V" shaped lugs under the top flange of the moulding box. The grab arms are pivoted from a lifting-beam suspended from an ASEA overhead electric crane. Then the box is lifted from the drag mould, traversed and lowered on to a vibratory shakeout (4). The grab arms are released and the crane returned to pick up the following cope box. During this period the sand has been dislodged and the empty box picked up by a similar crane and lowered on to the carriage (13), feeding the boxes back to the jolt machine.

Ingates and sprues are manually removed, the bath itself being removed from the drag mould by attaching a lifting hook (suspended from a pneumatic hoist) through the waste-outlet hole of the casting. The drag mould moves forward and is lifted on to the vibratory shakeout (5), and the return carriage (7), by overhead electric cranes.

Shot Cleaning

Bath castings, after cooling, pass to a continuous Tilghman shot-blasting machine, where angular grit is discharged in a high velocity stream from a number of centrifugal impellers fitted into the external walls of the cabinet. Here, the bath is suspended by the waste-outlet hole on a projection welded to each hanger, and both the hangers and the baths revolve slowly as they pass through each stream of shot, thoroughly cleaning the sand from the metal surfaces. Expended shot falls through the perforated floor of the cabinet into a collecting hopper, from which sand and dust are extracted before the shot is recirculated to the impellers. The dust-laden air is removed by suction, sand and grit particles being filtered out of the airstream and collected in a fabric-bag filter-unit.

Dressing

The ingate stubs on the casting are removed by machine grinding the bath edges on a special-purpose double-head surface grinder. The operations of removing any flash around the cored holes and the preparation of the surface for the subsequent enamelling are then carried out by skilled operators using portable powered tools.

Preparation of Enamel

All the company's enamel is manufactured on the same premises, the specification of the materials, the batch weighing and preparation and the melting processes all being accurately controlled and recorded. Enamel preparation commences on the upper floor of a three-storey building with the weighing and preparation of the materials in batches followed by thorough mixing and grinding in a rotary ball-mill. The prepared and ground dry-powder is then discharged from the ball-mill, into batch-type oil-fired melting furnaces, from which the molten enamel is tapped at intervals into a water quenching tank, solidifying the enamel into a crystal-like structure. After thoroughly drying, this material is screened and gravity fed to a vibrating feeder and into a further series of continuous ball-mills for final grinding, sieving and grading.

Dry-process Enamelling

The bath castings, prior to the application of a groundcoat of enamel, are thoroughly shot cleaned to remove all sand and grease. The surface of the bath is then wetted and sprayed with the groundcoat and after air drying, the enamel is fused on to the metal by heating in an oil-fired furnace at a controlled temperature. In the next operation, the

FIG. 10.—*Automatic-sequence electrical control-panels for the sand mills and sand-distribution plant.*

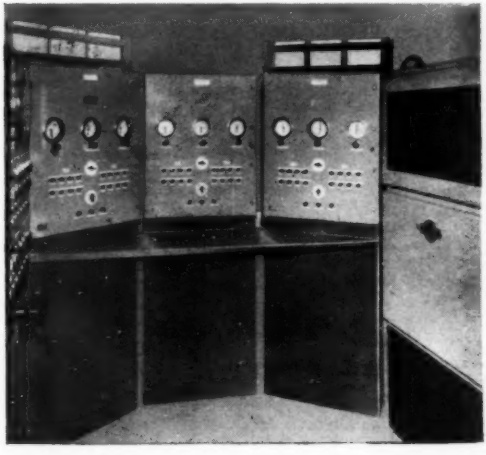


FIG. 11.—*Stripping a drag mould from the inverted pattern on the two-station indexing jolt moulding machine.*

bath is loaded into other enamelling furnaces and gradually heated to a red heat, before being removed by a travelling fork and placed in a universally rotatable fixture. Two enamellers then sieve dry enamel-powder on to the internal surface of the bath casting in successive operations, fusing the enamel in the furnace between each dusting. Finally, the finished baths (after cooling), are carefully inspected for surface finish and protectively wrapped before passing to the storage warehouse or despatch department.

Acknowledgment

In concluding this quite comprehensive account of the new British Bath Company's facilities, thanks are due to Mr. G. R. Webster, director, and his colleagues at Greenford for the information and illustrations made available on a generous scale. Acknowledgment is also made to Allied Ironfounders, Limited, for permission to print the story *in extenso*. Both the management and staff at the foundry and the suppliers of machinery and equipment installed in the plant are to be congratulated on the high degree of mutual inspiration which has made possible its economic working in quite a short space of time. It was not easy to erect the plant in existing buildings, but to do this and still maintain the current high output of baths by the old method indeed deserves high commendation from the rest of the foundry industry.

PLANT SUPPLIERS

The major suppliers of equipment to the British Bath Company include Augusts, Limited; Paterson Hughes Engineering Company, Limited; Cupodel, Limited; Incandescent Heat Company, Limited; Pneulec, Limited; Rownson Drew & Clydesdale, Limited; and Crompton Parkinson, Limited.

Sheffield's Smoke-control Proposals

Sheffield City Health Committee decided on April 28 to ask the Council to make an order creating the city's first central smoke-control order in a 439-acre area extending from the Royal Infirmary to St. Mary's Church, Bramall Lane, and from Crookesmoor to the Midland Station.

It is estimated that this zone will cost the Corporation £30,524 in the payment of seven-tenths of the cost of approved appliances and conversions. Of that amount, £27,217 is included in this year's estimates of the Health Committee. The remaining three-tenths of the cost, £17,442, is expected to come in Government grants. Properties with an expected life of less than five years have been excluded as uneconomic for the installation of smokeless appliances. It is hoped that the proposals will operate from May 1, 1959.

TWO LARGE CONCERNS manufacturing electrical equipment—English Electric Company, Limited, and Crompton, Parkinson, Limited—have announced price reductions for their electric motors.

Lancashire Dynamo Equipment for Russia

Worth £367,000, an order for automatic control equipment for a tyre factory in Russia is to be placed with the Rugeley Works of Lancashire Dynamo Electronic Products, Limited. The order is the biggest ever received at the works, and equipment for Russia may prove to be profitable to the company in the future "subject to the political situation remaining as at present," said a spokesman for the company.

The equipment is destined for Dniepropetrovsk, at which it is intended to build one of the largest tyre factories in the world and probably the largest outside the United States. The total equipment to be supplied to the factory by British firms may be worth between £10,000,000 and £15,000,000, it is reported.

THE ADDRESS of the London office of Craven Brothers (Manchester), Limited, is now Bridge House, 181, Queen Victoria Street, London, E.C.4 (telephone: CITy 2902).

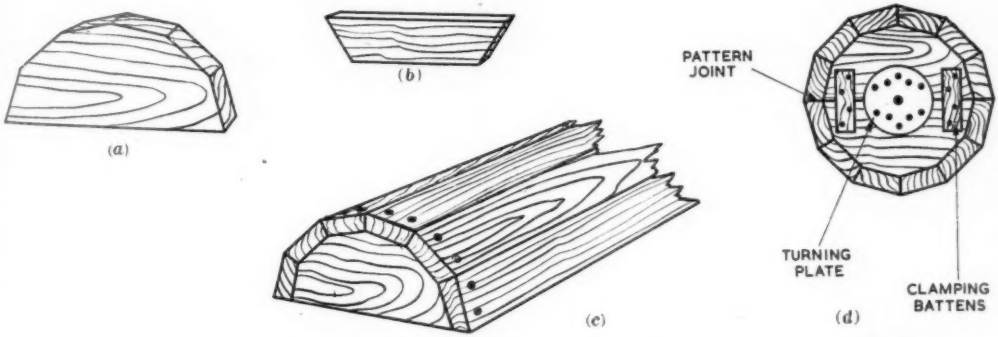
Lag Construction of Patterns

By "Checker"

Large patterns are sometimes of hollow construction, to effect economy of manufacture, and it is usual to make the pattern from lags or staves. This method gives a sound structure and a considerable saving in timber; in addition the pattern is made in the form of a shell, and is therefore much lighter in weight than if made from the solid.

Large cylindrical-shaped patterns are ideally suited to this method of construction and are often made of two halves dowelled together. End plates of suitable thickness are required and these are sometimes referred to as "heads." On patterns of considerable length, one or more similar plates are spaced at intervals, to provide rigidity. To enable the lags to seat evenly, on the end and intermediate pieces, a number of facets are cut. Fig. 1*a* shows a typical end-plate half; the number of flats on different patterns may vary to suit the pattern diameter, and thickness of lags to be used, but in all cases the half plates should be identical in shape. Timber for the lags should first be planed to equal thickness and cut to the desired lengths. Then, the bevelled sides should be marked on each end—this is done by using a template, as shown in Fig. 1*b*, which is usually made from plywood or metal. The tapered sides of the lags are produced by surface planing with an inclined fence, set to the correct angle; a small allowance should be left on these sides to permit hand planing as a finishing process. When the pattern has been built up, each half will be as illustrated in Fig. 1*c*, all lags being screwed and glued in position; many patterns made in halves and built up in this way are turned to size and shape in a lathe. The two halves are

FIG. 1.—*Views of the stages in the construction of a cylindrical pattern using lags, or staves: (a) Finished end plate with facets cut to take the lags; (b) perspective sketch of the assembled half pattern, prior to skimming in a lathe, and (c) methods of clamping the half patterns together, to avoid opening the joint, when turning the pattern to size.*



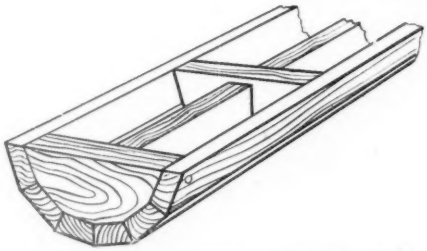


FIG. 2.—*Sketch showing a strengthening bar in position in a half pattern; this is used to increase rigidity of the construction when the pattern is of considerable length.*

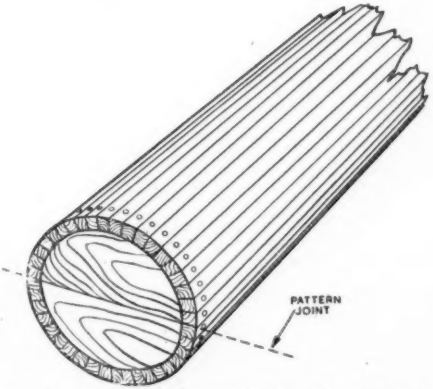


FIG. 3.—*Simplified method of construction employed to produce a cheaper pattern, utilizing scrap widths of timber.*

Lag Construction of Patterns

normally dowelled together and one method to avoid any tendency for the joint to open while turning is to use two fastening battens, secured at each end, with screws in each half pattern (Fig. 1*d*). These are in addition to any other holding device, such as end turning-plates, one of which is also shown in the illustration.

Sometimes the open space on the pattern joint between the heads and lags is filled in. When this is considered necessary, these fillers are fitted, so that when secured in place they are $\frac{1}{16}$- to $\frac{1}{8}$-in. below the joint face. It also is deemed advisable to include strengthening pieces running the full pattern length and these are fixed between the end and intermediate pieces as shown in Fig. 2.

When only a cheap class of pattern is required, it can often be constructed by shaping all end and intermediate pieces into complete semi-circles; they are dowelled together either before, or after, the necessary diameter is finished to size—care being taken that this diameter is suitable for the lag thickness which will be used. The lags may be from $\frac{3}{4}$- to 1-in. sq., according to the required pattern diameter. If desired, a slight taper can be given by trimming in a planing machine, set at the required angle, or by hand planing, when fitting the lags or strips into position—all lags should be secured by glue and nails followed by finishing to size as in Fig. 3. Often it is possible to finish-off the pattern to size by using rough sandpaper which quickly removes any slight protrusions where the lags are joined. Not only is this a quick method of patternmaking, but it possesses the additional advantage of utilizing otherwise scrap timber, thereby effecting a considerable economy in the patternshop.

Larger Turnover, Smaller Profits for Hall Engineering

Group profits of Hall Engineering Industries, Limited, declined, before tax, from £845,009 to £759,375 in 1957, owing mainly to increased labour costs and keener competition, but turnover increased to £10,860,000 from £10,180,000, states Mr. E. N. Hall, chairman. A final dividend of 6 per cent. makes a 10 per cent. total for the year, as previously.

The company's South African subsidiary continues to make satisfactory progress, but the Canadian recession has added to difficulties in that market. This year will be a harder one in which to maintain profits, but improved design and the regular introduction of new plant should enable the group to meet changing conditions, adds Mr. Hall. Tax absorbs £462,427 (£482,410), leaving a net profit of £296,948, against £362,599, of which £295,558 (£366,035) is attributable to the parent company. After dividends, the group balance forward is raised from £270,385 to £433,118.

Approximately £500,000 was spent during the year on developments at home and overseas, on plant replacement and reorganization programmes.

Cast-aluminium Underframe Pedestal

In the construction of light-alloy commercial vehicle bodywork the provision of cross-bearer supports or "underframe stools" to give adequate rear-wheel clearance simply and effectively has been a test of the designer's ingenuity. Designs have usually been riveted fabrications of extruded sections and sheet material. A die-cast aluminium underframe pedestal (Fig. 1), which is now available from Northern Aluminium Company, Limited, by providing a unit ready for mounting will probably enable body-builders to reduce costs in this connection. The advantages of this new cast unit lie in the fact that the labour involved is reduced to that of fitting three bolts between

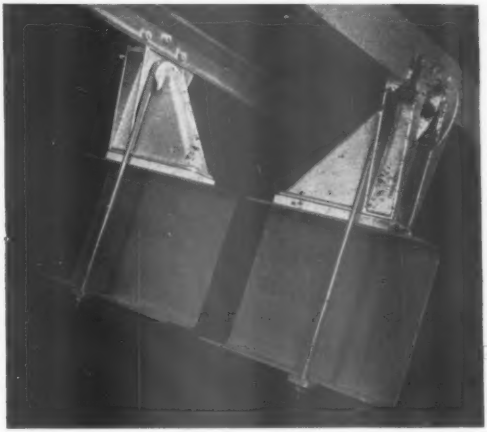


FIG. 1.—*New die-cast aluminium underframe pedestal.*

cross-bearer and pedestal and mounting the bearer assembly to the chassis with a "U" bolt. The retaining groove for the "U" bolt is so positioned to ensure that the pedestal is always in compression, thus making the best possible use of the properties of the casting, which is in Noral 117 alloy (B.S. 1490 LM4M).

Machine-tool Orders Fall

Orders for the machine-tool industry again fell in value in January, and, at £75,300,000, represent less than nine months' work at current rates of output. New orders received during the month totalled £6,600,000, equalled the monthly average for 1957, and were better than any month since July last year. But the rate of orders is considerably lower than that of 1956 and 1955.

The Board of Trade recently asked firms to review their order-books to ensure that no lapsed orders remained in the figures, and this accounted for part of the decline in the value of outstanding orders. Home orders in January totalled £4,800,000, against £4,900,000 in the corresponding month last year. Export orders, at £1,800,000, were the same as the 1957 average, but £700,000 lower than January last year. Deliveries rose sharply to £8,600,000, but were below the October record of £9,000,000.

Equipment & Supplies

Coreless Induction Furnace

The advantages of induction melting for continuous production are very well known; and many foundries make use of the principle to obtain comparatively small melts at frequent intervals. Until recently, however, only two main types of coreless equipment have been available: mains-frequency and high-frequency units. Mains-frequency coreless induction plant is comparatively low in capital cost but is limited by the large minimum size of the starting charge and by the fact that the smallest capacity is about 16 cwt. High-frequency melting, while not subject to these two limitations, normally requires an expensive motor/alternator set to give the frequency conversion. This equipment has serious limitations; its initial cost is quite high; and since it has moving parts it requires special foundations, a fair amount of supervision, and skilled maintenance.

Two firms have now collaborated to produce a new type of plant: they are Metalectric Furnaces, Limited, Smethwick, and Hackbridge & Hewittic Electric Company, Limited, Walton-on-Thames. The plant they have developed is an h.f. induction melting unit which uses a glass-bulb mercury-arc rectifier as a frequency convertor. For this are claimed very important advantages. The capital cost is much lower than that of a motor alternator, being about the same as the cost of mains-frequency equipment. As there are no moving parts except the cooling fans for the rectifier bulbs, no special foundations are needed; and once installed, the plant can be expected to give trouble-free service without attention for very long periods. Moreover its conversion efficiency is greater than that of the motor alternator. A further advantage claimed for the new design is that no capacitor switching is required—a point which will appeal to anyone who has used traditional equipment.

The plant consists of a main isolating switch, a convertor-input transformer, the convertor-cubicle (containing the glass-bulb mercury-arc rectifier), an h.f. transformer, a capacitor bank, and the furnace itself, all shown in Fig. 1. Operation is very simple: one pair of push buttons controls the main isolating switch, one pair controls the application of h.f. current to the furnace, and a single knob varies the power input. The furnace itself is a normal coreless induction design arranged for lip-axis tilting.

The equipment is fully developed for ratings up to 100 kw., and is suitable for all ferrous and non-ferrous metals. Larger sizes are in an advanced stage of development. A small prototype unit is in operation at the works of Metalectric Furnaces, Limited, and a 10 cwt. production unit is to be installed in a Midland foundry in the very near future. The principle of the converter was demonstrated on the stand of Hackbridge & Hewittic Electric Company, Limited, at the Electrical Engineers' Exhibition recently held at Earls Court.

FIG. 1.—*Layout of the coreless induction melting (crucible) furnace utilizing a glass-bulb mercury-arc rectifier for the electrical conversion. (Metalectric Furnaces, Limited and Hackbridge & Hewittic Electric Company, Limited.)*

Ringelmann Chart

Charles Griffin & Company, Limited, 42, Drury Lane, London, W.C.2, draw attention to the availability of standard (4-in.) Ringelmann Charts which, in view of the Clean Air Act requirements, now have major interest for all smoke-producing industries, including foundries. The introduction of the British Standard (B.S.2742C) having a 10-cm. version of the established Ringelmann Chart may possibly lead to the belief that the 4-in. Chart (as mentioned in the Beaver Report and in official communications) is rendered obsolete, but this is not the case. The Chart, which has been in use for 60 years, consists of "tints," 4-in. square, formed by ruled grids, and is used for the assessment of smoke density by direct viewing along a line of sight to the smoke issuing from a stack. It has, in fact, been available for many years and is a simple, practical and remarkably economical method. For use it is mounted on a vertical board—either left in a fixed position for viewing one, or closely adjacent stacks, or made portable at the top of a pole which can be inserted into sockets in various positions for viewing chimney smoke. When smoke is to be viewed, the operator stands back from the Chart a distance of 50 ft.—or the minimum distance at which the grids merge into tints—and then, by raising or lowering his head, the smoke issuing at the outlet is directly compared with the different shades. The Chart must not be covered by glass or any other transparent substance or inaccuracy results.

PACKERS SUPPLY COMPANY, LIMITED, of New Malden, Surrey, have placed on the market their new "GPT-SD" tensioning tool for steel-strip binding of packages, which has been designed for operating on all rounded and irregular shapes. It is made in three sizes, for ½-in., ⅝-in., and ¾-in. strapping.

Foreign Economic Reports

The following extracts have been prepared from recent economic reports emanating from the Export Services Branch of the Board of Trade. In each case an attempt is made to include mention of trends which may influence foundry business.

Italy:—At the annual general meeting of the Italian Confederation of Industry, the Minister for Foreign Trade drew particular attention to the success of Italy's liberal foreign trade and payments policies and also to the fact that nearly 84 per cent. of Italian exports in 1957 consisted of manufactured products. Production of steel and pig-iron in January, 1958, was respectively 575,000 tons and 158,000 tons. This represents increases of 14,000 tons and 5,000 tons above the production in December, 1957. In 1957, 351,799 motor vehicles were produced in Italy, an 11.4 per cent. increase on production in 1956. This total was divided as follows:—Motor cars, 318,488; lorries, 23,669; buses, 2,247; trailers, 7,395. During 1957 the shipyard at Palermo repaired 290 ships having a total of 3,000,000 tons deadweight. Total hours worked in the yards increased. The possibility of competition in the repair of merchant ships from the shipyards at Malta is causing some concern in Palermo, but it is believed that any competition could be effectively met.

Sweden:—For the first time Sweden's annual production of iron-ore exceeded 20,000,000 tons, the 1957 total being some 5.8 per cent. above the previous year's record. The recent laying-off of employees at the state-owned Norbottens Ironworks has led to a revival of the suggestion that a plate-rolling mill should be established at the works and a delegation of trade unionists recently discussed the matter with the Prime Minister. No appreciable change is to be made in Swedish prices of iron-ore for delivery in 1958.

Belgium:—Industrial activity in the first month of 1958 was generally well maintained in January although seasonal factors (as well as Government restriction of their public works programme) affected building and cement production. Steel production totalled 549,210 tons. This is 15,000 tons less than in January, 1957, but 18,000 more than in December. The industry is feeling the effects of the recession in the booking of new orders, but prices have been trimmed and production is in effect being well maintained. The engineering and metal-working industries are also having to watch prices closely to maintain a flow of new orders, and the level of production in January was below that of the corresponding period last year.

Austria:—The winter weather has had its usual depressing effect on Austrian economy. In particular, bad weather prevented the resumption of outdoor work in the building trade which usually takes place. The number of unemployed in this industry was for February, 1958, 9,000 less than for January, 1958. The corresponding difference for 1957 was 17,400. Furthermore the weakness of the demand for raw materials and the general easing of West European demand have reduced Austrian sales abroad. Exports of important products such as aluminium were sluggish and in many cases have declined. On the other hand, investment of almost all kinds both in the private and public sections, continued at a high level. This was facilitated by an adequate supply of credit as a result of the favourable balance of payments position and the expansion of private savings.

The 1957 production figure for pig-iron is estimated at 1,950,000 tons, crude steel at 2,500,000 tons and rolling mill products at 1,600,000 tons. This is an increase of 12 per cent., 20 per cent., and 16 per cent. respectively over 1956. Exports of iron and steel in the first nine months of 1957 totalled about £500,000. Aluminium-ingot production in 1957 is estimated at 75,000 tons compared with 70,764 tons in 1956. Despite the higher production, there has been a slight fall in exports. A contract has been concluded between the Osterreichisch Alpine Montangesellschaft and the Turkish State Railways for the supply of steel rails, sleepers and other materials to a value of over £2,000,000.

India:—Substantial offers of foreign aid were received during the first few weeks of 1958. A new battery of 26 coke ovens was inaugurated at the Jamshedpur Works of the Tata Iron and Steel Company on January 21. By June or July of this year the Tata Iron and Steel Company will have an additional capacity for the production of 3,000 tons of pig-iron per day. Taken with the expansion in pig-iron capacity of the Indian Iron and Steel Company, which is likely to materialize within a few weeks, India's iron production in 1958 is likely to be 600,000 or 700,000 tons more than 1957. A factory for the production of piston rings, established by a West German manufacturer, was formally opened in January. Its capacity is for 4,500,000 piston rings *per annum*. Other projects involving foreign interests mentioned during the month include a scheme for the manufacture of earth-moving appliances with United Kingdom collaboration; a scheme for the manufacture of tyres with Italian collaboration; and an agreement between an Indian firm and a West German firm for the manufacture of radios.

Burma:—Arrangements have been made for the appointment of an expert from Eastern Germany to advise on the exploitation of iron deposits found near Taunggyi in the Southern Shan State. It is reported that 30 tons of ore have already been extracted from this area.

Venezuela:—Exports, which normally experience a seasonal decline at this period owing to low water in the Orinoco River, fell somewhat more than usual due to a decrease in European and U.S. demand. The difficult situation of the Upata Mining Company (manganese) has not improved and operations remain at a standstill.

Chile:—During the first two months of 1958, Chile's adverse balance of payments, resulting from the continued weak price of copper, became increasingly apparent. The Government have continued to introduce measures designed to produce internal economic stabilization. They have refused to authorize an increase of more than 20 per cent. in 1958 salaries and pensions to offset the rise in the cost of living in 1957, and have expressed their intention to ensure that any increase in Government expenditure is matched by an increase in revenue. On January 10, the Copper Department recommended that the 1958 output of the two large American-owned companies should be cut to 90 per cent. of their 1956 production. The Anaconda copper subsidiaries agreed to this. No workers are to be discharged as a result of this policy. Iron-ore production during the first ten months of 1957 totalled 1,287,859 tons, 7.5 per cent. less than during the equivalent period of 1956.

Switzerland:—Following the announcement of the discovery of uranium-bearing strata in the galleries of the Grande Dixence barrage, a "Swiss Consortium of Uranium Prospection" has been formed with headquarters at Berne. Besides prospection, the consortium's functions will include exploitation and scientific research work in radioactive materials with particular reference to protective measures.

Association of Bronze and Brass Founders

Report of Activities and Progress in 1957

The 15th annual general meeting of the Association of Bronze and Brass Founders took place at the Connaught Rooms on Wednesday last week when the reports of the president, Mr. P. B. Higgins, and of the chairman of the Technical Committee were presented.

PRESIDENT'S REPORT

In his report the president said that the past year had seen a considerable number of developments both national and international which had called for a good deal of attention by himself and by the Council who had ably supported him. He had been impressed by the fact that many associations had been trying to deal separately with legislation and other matters which could have been better dealt with if they had consulted each other. He had, therefore, made an effort to set up some form of liaison between the non-ferrous interests and between the ferrous and non-ferrous foundry associations, in order that such matters could be dealt with more effectively and knowledge and ideas on these subjects could be pooled to everyone's benefit.

Clean Air Act

The Clean Air Act, he pointed out, concerned everyone and was a very important matter for the industry since it virtually prohibited the emission of dark smoke, grit and dust and any offensive matter. The Act made provision for the transfer to the Alkali Act of works and processes which found it impossible in present circumstances to comply with the Clean Air Act. At a public enquiry held in May, 1957, representations had been made by the British Non-Ferrous Metals Federation and by I.C.I. Metals, Limited, which the Association had strongly supported, for copper works to be scheduled under the Alkali Act. An order had been drafted by the Ministry as a result of this enquiry and has been submitted to the Association and various other bodies for comment. It did not cover the needs of Bronze and Brass Founders and a further representation had been made.

A copy of the Association's letter has been sent to members for their information. Whatever the outcome, such legislation was the clearest evidence for the need of a trade association to protect the industry it represents. Certain sections of the Clean Air Act came into force on January 1, 1957, and attention had been drawn to them in the *Bulletin*. The remaining sections came into effect on June 1, 1958. The Council would watch the development closely and take, where necessary, any action open to them. In closing his remarks on this topic, the president suggested that member-firms would derive benefit from making use of the National Industrial Fuel Efficiency Service.

Thermal Insulation Act

The Thermal Insulation Act was a further piece of legislation affecting all new industrial and commercial buildings. The Council had asked for the exemption of bronze foundries because it was difficult to practise thermal insulation and a high standard of general ventilation. The matter called for the collaboration of other founders associations.

Office Regulations Bill

The Office Regulations Bill was a Private Members Bill and had been carefully studied by the Council. It had not received a second reading but if the matter came up again, or the Government introduced a similar Bill, it would again receive serious attention.

Regulations for Non-ferrous Foundries

The Association had been represented on the Joint Standing Committee for Safety, Health and Welfare Conditions in Non-ferrous Foundries for more than four years. A great deal of hard work had been done by all the representatives, and especially by Mr. G. T. Hyslop, who had been one of the Association's representatives on the Committee until last year. Owing to pressure of work, he had had to resign from the Committee, and thanks were due to him from the Association for what he had done. Work was still proceeding and the first report of the Committee was published last year. It was deserving of study, because from it the Ministry of Labour was trying to make regulations for non-ferrous foundries, similar to the Iron and Steel Regulations.

European Free Trade Area

The European Free Trade Area was a matter which has been exercising everyone's mind and the Council had been trying to cope with the very voluminous literature which had appeared on the subject. It was keeping in touch with the Board of Trade and with other associations with similar interests so that information and views could be exchanged and whatever action might be desirable could be taken at the right time.

European Committee of Foundry Associations

The European Committee of Foundry Associations had been formed in 1953 by the six countries of the European Steel and Coal Community and who had since formed the Common Market. Since that time, more countries had joined until there were now 12 European countries, including Great Britain, represented on the committee. At first, the committee had been composed of ironfounders but it had gradually widened its field of activities until all foundries were now represented. The committee was able to deal with all matters of interest to the foundry industry and had so far set up 12 commissions dealing with a variety of matters including recruitment and training, raw materials, commercial matters, technical matters, industrial diseases and standardization. These had been set out in the *Bulletin* for October-December, 1957.

The iron and steel founders of the UK joined the committee in April, 1957, and the Association requested him to attend the October, 1957, meeting in Amsterdam as an observer. He had been impressed with the very important work being done in this committee. After hearing his report, the Council had decided that the bronze and brass founders in this country could not afford to abstain from this organization and an application for membership had been made accordingly and, in due course, had been approved. The president also gave a report on a meeting held recently in Italy.

International Foundry Apprentice Competition

The International Foundry Apprentice Competition had been promoted by the European Committee of Foundry Associations and the first competition had been held last year in Stuttgart. That competition had been organized rather hurriedly but in the event, the British boys (two ironfounders and one aluminium founder) had acquitted themselves well in the circumstances. There was a difficulty in selecting British candidates and some European countries were better organized in this respect. However, he was pleased

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to report that the four foundry organizations in the UK had agreed to co-operate with the Institute of British Foundrymen in selecting British candidates this year. He hoped members would encourage their apprentices to enter.

Training and Education

Important developments were taking place in the facilities for training for all levels of the foundry industry. There were many facilities for local training; the National Foundry Craft Training Centre was to be enlarged to enable the Centre to meet the demands being made upon it; the National Foundry College was providing higher courses and the University of Birmingham had started a post-graduate course in foundry science and engineering in order to promote the flow of highly qualified graduates into the industry.

These developments were bound to raise the standard of the foundry industry and increase its ability to meet the requirements of the engineering industry, whose own standards were constantly rising, and they would enable founders better to meet the competition of other countries. It was, he said, in their own interest that such moves should be supported and he would therefore ask members to give their support to them in any way possible and not least by encouraging young men to make use of the facilities for training and education available.

Liaison with Other Associations

The items mentioned earlier concerned all sections of the foundry industry and also some others with which the Association was allied. He had been impressed with the necessity of all sections working together, which would certainly be much more valuable and effective than working separately. He had therefore taken the initiative and succeeded in calling together heads of a number of associations in October last. Since then a further meeting had been held, at the invitation of the chairman of the British Steel Founders' Association. So far as the copper base industry is concerned, he was hopeful that some form of liaison, possibly within the British Non-Ferrous Metals Federation, would be evolved.

Technical Committee

The Association's technical committee had continued to do valuable work for the industry and was a source of great strength to the Association. Members, he said, should do all they can to support them and to make known the work which they were doing.

Technical Advisory and Research Group

He was pleased to report that the technical advisory and research group had increased its membership during the year. It had also improved its influence by the formation of an advisory committee to guide the British Non-Ferrous Metals Research Association on the problems which foundries want to be tackled. It was still supported, however, by only 40 members. Obviously everyone in the industry should support work which is essential for the future well-being of the industry. Members of the group receive quick and valuable help to their technical problems.

Cost Report

The publication of the cost report has, he said, been held up. The compilation of the essential material, the drafting of it and the publication called for a great deal of time and as all the work was done voluntarily, it was not always possible to devote the time to these matters that was desirable. However, the printing was now in hand and if publication had not already taken place, copies would be available in a very short time. The Council considered that this was probably one of the most practical guides to costing and estimating which had been prepared and if it stimulated clearer thinking on these matters and lead to better practice it will have been invaluable.

Publicity

The president mentioned that the Council appreciated the publicity given to the Association by the FOUNDRY TRADE JOURNAL. The publicity committee was engaged in getting out new propaganda material with the object of interesting non-member firms in the Association.

Membership

Members, he suggested, often asked themselves—what did they get out their membership? The answer could be found in all the subjects dealt with in the *Bulletin* and circulars. Where else, he wondered, could they have their interests so ably looked after in the face of impending government legislation? Where could they obtain information as to what was going on in the European Committee of Foundry Associations? How could they play their part with the bigger ferrous foundry organizations and the government departments, who accepted that the Association could speak for the copper base foundry industries? There were many firms in the industry who should support the Association, their trade organization, but who had not yet come forward to join, in spite of invitations addressed to them. It was important that these firms should join, supporting the Association's prestige with their membership, its funds with their contributions and sharing the burden of the work which was being done. These non-member firms received some of the benefits which were made available for members. This was something with which each member could, he said, help, he asked those present to do all they could to get such non-member firms to join.

TECHNICAL COMMITTEE REPORT

The Technical Committee at the four meetings held during the year dealt with many questions covering a variety of subjects on which the chairman reported as follows:—

Specifications

Points arising from the revision of BS. 1400 had been fully discussed in the Committee and guidance given to the Association's representative on the British Standards Institution working party. Information on these had been set out in the *Bulletin* in order to keep members informed. The main difficulty, and practically the only one, had arisen with the properties proposed for Aluminium Bronze AB.2. Very great care had been taken to enable all points of view to be ventilated and to receive full consideration and to make sure that what is being done was understood.

The publication of the revised draft had, the report continues, been delayed whilst agreement was sought on the proposals, but it was anticipated that the revised standard would pass through all the remaining stages by the end of this year. When the draft had been issued to industry for comment, a copy would be sent to each member for his comment. It was thought that members would agree that it set standards which were practical for the experienced foundryman, but an assurance was given that any criticisms which members make would receive very careful consideration.

Companion Volume

When the BSI publish the revised specifications the Association would be publishing a companion volume to describe the alloys, give guidance on the choice of alloys for specific purposes and much more relevant information. A sub-committee had the subject well advanced and the work would be finalized shortly. The volume would not be intended for the use of

founders so much as the guidance of their customers. It was hoped that members would ensure that copies were distributed to customers, as by the correct use of the alloys the user could obtain greater satisfaction, freedom from failures, and the reputation of the founders' products was thus enhanced.

Casting of Test-bars

The British Standard specifications, the report notes, called for certain physical properties to be produced from test-bars cast from the alloy. Some guidance on the correct methods of casting these test-bars had already been given, and further valuable work had been done by the British Non-Ferrous Metals Research Association which would soon be available to members of the technical advisory and research group. The user of castings was entitled to proof of the quality of the metal in the castings and this was provided by the production of test-bars by the founder, therefore it was extremely important that the technique of casting these should be mastered and carefully carried out, and not treated as of little consequence.

Repeat Tests on Test-pieces

A conference, the report states, had been called last year by the BSI to discuss the acceptance of test results, as there were differences in the ferrous and non-ferrous codes of practice. The established rule of acceptance of the latter that one bar in three should pass, was attacked. This conference had not only given an opportunity of defending this position but of correcting common and mistaken views on the purpose of test-bars.

International Standards

With the growing interchange of goods between countries, and the need for spares and replacements for them, there was a growing realization of the need for international standards. This would take many years to achieve, but a start had been made with copper alloys at Stockholm in 1955 and a second conference was to be held at Harrogate next month. One of the members, Mr. A. R. French, had been invited to act as a British representative on the committee dealing with cast copper alloys. The Technical Committee, therefore, would be well informed about the proposals on which advice could be given.

Standardization of Inspection Procedures

The Association's agreement drawn up with the Ministry of Supply was reported to be still working smoothly. An invitation had been received from the BSI to nominate a representative to serve on a new committee to consider a standard for the classification and inspection of castings, both ferrous and non-ferrous, in accordance with their uses (*i.e.*, to classify the castings according to the danger resulting from failure).

It was felt that if the BSI undertook this work then a unified method of classification and inspection could be applied throughout industry, and avoid the necessity for the Services to issue separate specifications applicable only to their needs. Apart from the Services, some 30 associations and inspecting authorities had been invited to serve on this committee, which could produce a very useful classification for industry.

Papers for America

The Technical Committee had been asked to contribute a paper to last year's AFS Congress. Jointly with the British Non-Ferrous Metals Research Association, a paper was drawn up entitled "Co-operation for Technical Advancement in the British Bronze and Brass Foundry Industry." It was felt that American founders would be interested to know of the very excellent technical facilities available and the basis on which they were provided. Similarly, information on the British die-casting industry had been provided for a paper to be presented this year.

Technical Liaison Committee

The research group had been in existence for some years and during the past year had set up a liaison committee to advise on work to be undertaken and on questions which arose during the course of the work. This, it was reported, was proving to be very worthwhile.

Research was providing information and techniques of great value to the founders which would, in time, be regarded as part of their common know-how. It was, therefore, important, in order to make this work possible, only fair that all firms in the industry should support this work; for their contribution they could get much help with their current technical problems; the benefits did not by any means all lie in the distant future.

European Committee of Foundry Associations.—The technical work of the European Committee, the report says, seemed likely to provide the Committee in the future with a good deal of advisory work. So far it had only had to consider a draft of a consumer manual which did not seem to be as suitable as its own companion volume.

Clean Air Act.—The Association had been called upon to consider the Ministry's proposal for scheduling processes under the Alkali Act. Unfortunately, its recommendations for amendments had not been accepted by the Minister.

Technical education.—The Association welcomed the increasing facilities for technical training at all levels and the opportunity for advising on syllabuses and other aspects and for representation on governing bodies.

Technical talks.—In order to assist in the continuance of the type of area meetings which had been held during the period of conditional aid, members of the Technical Committee were preparing a number of talks on suitable subjects to be given at area meetings.

Membership of Committee.—The Committee had received with great regret the resignation last year of Mr. R. S. Moore, who had been going abroad. During his time of service he had proved a very valuable member. He had been replaced by Mr. A. Wilkinson, of the Anti-Attrition Metal Company, Limited.

Deputy Chairman.—The work of the chairman of the Committee had steadily been increasing and he therefore welcomed the idea of having Mr. A. R. French as deputy chairman as this would enable the work to be shared to a great extent.

The chairman concluded by thanking his colleagues on the Technical Committee for their excellent support during the year, and for the great deal of work they had carried out, particularly with the BS. 1400 revision and the companion volume. The secretaries had been very efficient in their work for the Technical Committee and Mr. Rogers in particular had saved the chairman a great deal of work, for which he personally was very grateful.

ANNUAL MEETING

Following the general meeting, the fifteenth annual business meeting of the Association was held. After apologies and minutes had been dealt with and the audited accounts approved, the president announced that the ABBF share of the cost of the International Foundry Apprentice Competition this year (approximately £150) would be borne by Council members. He added that general membership contributions to the fund would, of course, be very welcome. As a result of this and economies very kindly instituted by the secretaries, it would not be necessary this year to

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increase subscriptions of members to the Association.

The election of officers was then proceeded with, the results being as follow: It was proposed by Mr. W. T. Hobkirk, and seconded by Mr. A. F. Rayner, that Mr. P. B. Higgins be re-elected president for a further term—a proposal which met with unanimous acclaim. Mr. W. Brown was elected vice-president, and as trustees, Mr. W. S. Lawson and Mr. G. T. Hyslop were re-elected (in addition to the secretaries—Heathcote and Coleman). The four retiring members of Council, Mr. A. R. French, Mr. W. S. Lawson, Mr. A. F. Rayner, and Mr. J. C. Sheckell, were re-elected *en bloc*, as were members of the Technical Committee, with the exception here that Mr. A. R. French was made deputy chairman (Mr. R. Lancaster remaining as chairman). With the exception that Mr. R. Lancaster retired from the publicity committee the membership otherwise remains unchanged; although the Council was given power to co-opt a member to fill the vacancy. The cost committee was also re-elected, and Mr. W. R. Buxton was re-elected Editor of the Association's *Bulletin*, the latter being warmly congratulated on his work in this connection. Dealing with ABBF representatives on other bodies, appointments of existing personnel were confirmed.

Kemp Chatteris & Company, chartered accountants, were re-appointed auditors and Heathcote and Coleman as secretaries. In thanking the secretaries for their services during the past year, the president extended a special welcome to Mr. Heathcote, who, members were pleased to note, was able to be present on that occasion. The meeting concluded with a vote of thanks to the president, which was proposed by Mr. W. T. Hobkirk.

Manganese Bronze & Brass Profits

Although the order-book of the Manganese Bronze & Brass Company, Limited, is better than a year ago, the chairman, Mr. J. C. Colquhoun, points out that British industry has not entirely escaped the contraction in world trading conditions and how this would develop was difficult to foresee. In anticipation of the European Free Trade Area, the company would make every effort to ensure that plant was maintained at maximum efficiency.

Profits again improved in 1957, the group trading balance being £726,246 (£630,064). Group net fixed assets increased by £410,322 to £1,916,456, reflecting revaluation of subsidiaries' assets, etc., and the acquisition by Lightalloys, Limited, of the Caplin Engineering Company, Limited, and Capco (Sales), Limited. Stocks are higher at £986,134 (£965,926), despite the steep drop in metal prices. This is explained by a weight increase in stocks covering a weight increase in the order-book—part of the method of eliminating market risk as far as possible.

The total ordinary dividend on the increased capital is 16¼ per cent. against 13¾ per cent.

Refractory Shapes. An eight-page illustrated pamphlet received from Refractory Mouldings and Castings, Limited, Pleasant Place, High Street, Kegworth, near Derby, details the services the company renders and the products they manufacture. Refractory shapes are offered to customers requirements from a series of high-grade refractories, and it is interesting to note that charges for patternmaking are usually quoted separately. The business undertaken is of the "tailor-made" type and as such is quite valuable to industry.

National Federation of Iron and Steel Merchants

The annual general meeting of the National Federation of Iron and Steel Merchants was held last month at the Dorchester Hotel, London, W.1.

Among the items which the Independent Chairman referred to in his address were restrictive trade practices. The first case, he said, had not yet come before the Court and the long-term effects of this legislation on the Iron and Steel trade could not yet be predicted. With regard to the International Federation, contact had been maintained with the Continental merchants as observer members of the International Federation of Associations of Steel, Tubes and Metal Merchants. He mentioned that this year, the eighth annual general meeting of the International Federation, was to be held in June, in Brussels, as a World Congress of Iron and Steel Merchants. Merchants from all over the world were being invited and the event was to coincide with the Brussels International Exhibition. A number of British representatives were to attend.

One matter of unusual interest which had been raised during the year had been the suggestion that a plastics section of the International Federation should be set up, in view of the development of the use of plastic semi-finished products in place of those of metal. It appeared from an enquiry held in France that there was already considerable demand for, and trade in, plastic sheets, tubes, etc., in that country. The enquiry also revealed that the majority of the French firms, which were producers of these plastics, already fabricated similar non-ferrous metal products. In referring to the proposal for the setting up of a European Common Market and associated with it a Free Trade Area in which the United Kingdom would participate, he said, the negotiations on the Free Trade Area had run into a number of difficulties and various compromises had been suggested.

Visit to Germany

In conjunction with the German Merchant Association in Bochum, the Federation organized a visit to Western Germany which took place at the end of October. The party had toured parts of the Ruhr and Rhine areas and were taken over a number of steel mills, merchants' offices and warehouses. Although it had been generally felt that the methods of handling and stacking in the warehouses visited were not superior to those of the British, the party had been very impressed by the offices of two well-known merchant organizations. It seemed that these were far larger than similar offices in this country. This reflected the high proportion of the German trade dealt with by the direct merchants, being some 60 per cent. of total output apart from supplies from the mills to the motor-car industry.

Finally he dealt with the discounts granted to merchants. In this country, he said, the services which merchants offered, with their wide knowledge of the trade, did not seem to be as fully appreciated as they should be. Merchants played an important part in the country's economy and yet the discounts granted to them were often entirely inadequate, or even non-existent.

Mr. R. F. D. MILNER has been appointed managing director of Derby Cables, Limited, a subsidiary of Crompton Parkinson, Limited. Mr. Milner has been in the cable industry since 1912 and joined the Derby cable works in 1946, becoming general manager later the same year. He became a director in 1949.

Pickling Steel Castings

To provide facilities for the acid pickling of steel castings of various weights David Brown Industries, Limited, Foundries Division, Penistone, have designed and installed special tanks (Fig. 1) capable of holding even the largest of their products. Employed in conjunction with hand fettling, pickling of castings in hydrochloric or sulphuric acid ensures that all foreign matter is removed from the metal, and at the same time reveals any defects, such as cracks.

It is anticipated that the largest of the Penistone company's castings to which the pickling process will need to be applied will be the half turbine casings, weighing up to eight tons, for which orders are currently on hand for conventional and atomic power stations. Two identical tanks have been built, together with a neutralizing sump. A two-way reversible pump serves both tanks and is capable of effecting transfer of the liquid in five minutes. After lowering the casting (or castings), into the empty tank, the slinging chains are removed, and acid is then transferred from the other tank.

By means of heating elements the acid solution (about 10 per cent. strength) is kept to a temperature of about 60 deg. C. at which heat pickling goes on for about two hours. By loading the second tank in the meantime a continuous flow of work is ensured. Only very infrequently is it necessary to dispose of the acid, this being effected after a neutralizing lime solution has been added.

FIG. 1.—*Cast-steel turbine case being lowered into one of two new acid-pickling tanks which have been installed by David Brown Industries, Limited, Foundries Division, at their Penistone works, near Sheffield.*

Wages and Retail Prices

An inquiry into workers' earnings, in 68,200 industrial establishments made by the Ministry of Labour last October, shows that more than 2,250,000 were paid under systems of payment by results. The percentage of men paid this way has gone up from 18 in 1938 to 29 in 1955, and 28 in 1957. In some of the main industries, the percentages of all workers last October were:—Metal manufacture, 60; engineering, shipbuilding, and electrical goods, 51; vehicles, 39; precision instruments, etc., 29.

The index of weekly wage rates was unchanged in March at 113 (January, 1956 = 100). The retail price index was unchanged at 108 on the same base date. Some 232,000 workers received increases in pay. Decreases, which operated under sliding-scale arrangements based on the retail price index, affected groups of workers in mining, quarrying, and iron and steel.

After falling in February to its lowest level since the war, the number of unfilled vacancies notified rose slightly in March. The number remaining unfilled on March 12 was 217,000—8,000 more than in February. This compares with an unemployment figure of 433,000 on March 17.

Some 196,000 days were lost last month in industrial disputes, compared with 112,000 during February, and nearly 4,000,000 in March a year ago.

Industry in the Midlands

At a meeting of the Midland Regional Board for Industry held in Birmingham last month, Mr. Michael Halls, Regional Controller of the Board of Trade, reported that although unemployment in the region rose by nearly 1,000 in March, it was still only 1.4 compared with 2 per cent. for the country as a whole. Ministry of Labour figures, based on a count taken on March 17, showed that the number of unemployed rose from 27,995 to 29,087. In Birmingham and district there were 10,335 unemployed; in Coventry and district 3,625; in Wolverhampton and the Black Country 5,475, and in North Staffordshire 4,965. The number of workers on short time in the region rose from 7,355 at the end of February to 8,640 on March 22.

New Building Work

In 1957 more new factories and extensions were completed by industrial concerns than in any previous year it was stated; the boom in industrial building had, however, passed its peak at least for the time being. Latterly there had been fewer applications to the Board of Trade for industrial development certificates. The chairman of the Board, Major C. R. Dibben, said, "After reviewing the state of trade the Board can find no sign of any major decline of activity in the region."

Newton Chambers' Developments

Developments in the engineering division of the Thorncliffe works of Newton Chambers and Company, Limited, near Sheffield, are creating new capacities for production and service in modern industry, where a new stress-relieving furnace is coming into full use, an automatic welding machine is being introduced, new X-ray examination facilities have been installed, and an extended constructional shop is providing additional facilities for heavy fabrication.

Though primarily for the use of the company's own engineering division, linking with its Class I welding work on pressure vessels and the like, the new furnace will be available for the stress-relieving of vessels fabricated by other contractors. The furnace is one of the largest in the country, the internal dimensions being 16-ft. 6-in. high by 16-ft. 6-in. wide by 35-ft. long. With a movable door at each end, it is capable of taking vessels up to 15-ft. dia. and 100-ft. long, with a weight of 60 to 70 tons. It is gas-fired and its automatically-controlled temperature range is from 300 deg. C., for use in curing synthetic linings, to a maximum of 1,000 deg. C., for the heat-treatment of stainless-steel fabrications, etc.

The need for stress-relieving is growing in modern industry. It is essential for pressure vessels of Class I standards, and is increasingly necessary also for the removal of fabricating stresses which it is now known influence stress corrosion. The chemicals and gas industries are constantly making new demands for the removal of residual stress in vessels which must be subject to chemical processes or caustic embrittlement.

BY THE END OF THE YEAR the Municipal Tramways Trust of Adelaide, Australia, will have discarded its trams on all routes except one, in favour of new under-floor-engined, Leyland buses, equipped with semi-automatic gearboxes and two-pedal driving controls. Altogether, 172 Worldmaster buses were ordered from Leyland Motors, Limited, and the company is now making regular shipments of these.

ECGD Coverage in 1957-58

The Export Credits Guarantee Department's provisional balance on its commercial account for the financial year 1957-58 was some £4,800,000, resulting in a provisional cumulative balance on trading since 1930 of some £12,900,000. This balance represents the "underwriting reserve" in respect of liabilities of some £452,000,000. It has now been almost restored to the position at the end of the financial year 1951-52 when it stood at £13,000,000—to be reduced one year later to £1,300,000 because of heavy claims in respect of Brazilian transfer delays, and subsequently to a deficit of some £3,500,000.

Claims payments on commercial account, at £4,675,000 (provisional) were less than in 1956-57 (£5,411,000). Recoveries, at £4,864,000 (provisional) were, however, also lower than in the previous year (£5,397,000). Provisional figures for business underwritten for the encouragement of exports "in the national interest" show a surplus over the year of some £1,000,000, resulting in a cumulative balance of some £2,200,000 at the end of the financial year. The face value of short-term policies current at the end of the first quarter of 1958 was £544,500,000, compared with £518,600,000 at the end of the previous quarter, and £525,800,000 a year ago. The face value of medium term policies current at the end of the quarter was £221,400,000, compared with £205,800,000 at the end of the previous quarter, and £115,000,000 a year ago. Total business declared as shipped under these "commercial" insurances during the quarter amounted to £138,700,000.

A SERIES OF PUBLIC LECTURES on the uses of electronic computors is being held at Sheffield University. The present series covers a survey of types of computers and their uses in scientific research, industry, commerce and business. A more technical series is to follow for those who wish to make use of the computer operated jointly by the University and the United Steel Companies, Limited.

Mobile Exhibition for Continental Tour

The illustration shows the interior of a mobile exhibition of industrial valves and fittings manufactured by Newman, Hender & Company, Limited, which is shortly leaving Great Britain for a six months' tour through France, Italy, Switzerland and Western Germany. Various works will be visited in order to give interested personnel an opportunity of studying the company's products, whilst in some areas the mobile showroom will be parked on a central site when visitors will be invited to inspect the exhibits.

Company News

VAB PRODUCTS, LIMITED, brassfounders, etc., of London, W.1—No final dividend is to be paid on the £115,000 ordinary capital for 1957. The interim was 2½ per cent., as previously. The 1956 final was 7½ per cent. Group net profits declined from £18,692 to £7,604, after tax of £13,877 (£17,212).

MONSANTO CHEMICALS, LIMITED—The company is to acquire as an investment half the ordinary capital of R. H. Cole & Company, a private company engaged in marketing raw materials and equipment to the plastics, chemical, and electrical industries. The latter company will remain a separate entity under its own board of directors.

CRAVEN BROS. (MANCHESTER), LIMITED, machine-tool makers, of Reddish, near Stockport (Ches)—The company is paying an unchanged 5 per cent. final, making, with the reduced 2½ (5) per cent. interim, a total of 7½ per cent. for 1957, against 10 per cent. The 1955 total was 17½ per cent. Net profits stand at £114,958 (£54,152), with tax charged at £102,000 (£43,000).

JOHN DALE, LIMITED, manufacturers of collapsible tubes, etc., of London, N.11—The final dividend for 1957 is 15 per cent. on the capital increased to £375,000 by an issue of shares for cash. An interim dividend of 10 (22½) per cent. has already been paid on smaller capital. Group trading profits amounted to £428,861 (£374,277) and net profits to £133,772 (£112,561) after all charges.

BUTTERLEY COMPANY, LIMITED—A capital distribution of 8d. per 2s. 6d. ordinary share again makes 1s. per share, not subject to tax, for 1957. Group profit stands at £81,336 (£78,728), after tax of £35,523 (£63,144). A deduction from the balance is incurred in 1957 on activities of a department, after taking into account amounts set aside in previous years, of £73,739. This reduces the net profit to £7,597.

UNIVERSAL ASBESTOS MANUFACTURING COMPANY, LIMITED—Ordinary shareholders are being offered £260,000 6½ per cent. convertible unsecured loan stock, 1979-82, at £97 10s. per £100. This stock is by way of rights and £1 of stock is to be issued for every eight ordinary shares held on April 14. Holders of preference and ordinary shares may apply for any stock not taken up in this way.

WOLVERHAMPTON DIE CASTING COMPANY, LIMITED—The issue of £450,000 7 per cent. convertible unsecured loan stock, 1970-80, will be made at par. The Consolidated Zinc Corporation, Limited, will have £225,000 of the stock and the remaining similar amount is being offered to ordinary shareholders registered on April 8 on the basis of £2 nominal amount of the stock for every 20 ordinary 2s. shares held.

LAURENCE SCOTT & ELECTROMOTORS, LIMITED—A dividend of 15 per cent. is recommended on the £1,102,740 combined "A" and "B" ordinary capital for 1957. A payment of 15 per cent. was made for 1956 on the £882,190 capital prior to the one-for-four rights issue. Trading profit, etc., is £1,031,207 (£996,656) and the net profit £395,043 (£392,256), after taxation of £430,000 (£410,000), etc.

MATTHEW HALL & COMPANY, LIMITED, chemical and industrial engineers, of London, N.W.1—A capital dividend of 5½ per cent. (nil), tax free, out of capital profits from the sale of fixed assets, is being paid in addition to an unchanged 30 per cent., less tax, dividend. CIC permission has been obtained to a proposed one-for-three free scrip issue. Group profit is £99,319 (£107,376) after tax of £115,752 (£96,225).

SUPERHEATER COMPANY, LIMITED—CIC consent has been obtained for a capitalization of £463,050 of reserves in a one-for-one scrip issue to holders by May 15. The issue will be in the form of ordinary shares to the ordinary holders and "A" ordinary to the "A" holders. Exchange control has agreed to the use of renounceable allotment letters, subject to the extra-ordinary meeting on May 29, which will be posted on May 30.

BAKER PERKINS, LIMITED, manufacturing engineers, etc., of Peterborough—The company announces that the rights issue, already foreshadowed, will take the form of an issue of 252,666 ordinary £1 shares. They will be offered to ordinary shareholders in the proportion of one new share for every £7 stock at 27s. 6d. per share, payable on May 30. It is expected that the dividend will be maintained at the rate of 10 per cent. on the increased capital.

BABCOCK & WILCOX, LIMITED—A final dividend of 6¼ per cent. is recommended on the £9,405,497 ordinary capital as increased by a one-for-four rights issue at par. This makes, with the 7 per cent. interim on the former capital, a total distribution slightly above the 15 per cent. for 1956. Group profit expanded from £3,668,461 to £3,865,812 in 1957, and after taxation of £2,089,951, compared with £2,121,245, the net profit is up from £1,547,216 to £1,775,861.

MIDLAND ALUMINIUM, LIMITED—In the chairman's supplementary statement to the December annual meeting, it was reported that the profits for the five months to November had exceeded the total profits for the previous year. This improved rate of profit has been maintained during subsequent months, and the board has felt justified in declaring an interim of 5 per cent. on account of the year ending June 30, 1958. There was a single 3 per cent. dividend for 1956-57, compared with a 9 per cent. total previously.

WILMOT-BREEDEN (HOLDINGS), LIMITED, automobile and domestic appliance manufacturers, etc., of Birmingham—It is proposed to increase the capital to £4,372,500 by the creation of 1,050,000 5s. ordinary shares, the directors wishing to have a reserve of unissued capital available for issue if required for acquisitions by exchange of shares. Group trading surplus rose to £1,120,844 (£771,089) and a final dividend of 6 per cent. makes 9 (8½) per cent. for the year. Net profit was £382,287 (£215,801).

NORTH CENTRAL WAGON & FINANCE COMPANY, LIMITED—Subject to CIC consent, it is proposed to capitalize £526,333 of reserves by a one-for-three free scrip issue of new ordinary shares, and the directors hope to be able to recommend the same rate of dividend for 1958 on the enlarged capital. The final for 1957 of 1s. makes 1s. 6d. per £1 share and there is a special distribution of 7½d. per share out of realized capital accretions. Total payments are equivalent to 1956 on the 10s. shares prior to the 100 per cent. capitalization.

BEYER, PEACOCK & COMPANY, LIMITED, locomotive engineers, machine-tool manufacturers, etc., of Gorton, Manchester—Because diesel hydraulic locomotives are being used more, and to enable the company to have interests in all forms of railway locomotive power, a new company, called Beyer, Peacock (Hymek), Limited, was recently formed in which half the equity is held, states the chairman, Mr. H. Wilmot. The other half is held by the Armstrong Siddeley Development Company, Limited. Group profits for 1957 were £579,940, against £512,308. Distribution is the same at 16 per cent. Orders are fewer because of the economic plight of some countries, and it may be impossible to maintain turnover on the scale of recent years, Mr. Wilmot adds.

News in Brief

THE NEW PORTRAIT of the Queen in the Cutlers' Hall, Sheffield, was given its permanent frame, of a moulded-gilt surround surmounted by a crown, on April 28.

NORTHWOOD METALS, refiners, Sedgley, Staffs, is planning to build a three-bay non-ferrous melting shop on the Dormston Trading Estate, Burton Road, Upper Gornal.

Mr. F. BARTON has joined Newman Industries, Limited, of Yate, Bristol, as technical representative in the Lancashire and Cheshire areas. He will operate from the company's Manchester office.

STANTON IRONWORKS BAND and Stanton Girls' Choir gave a concert at the Cheshire Homes, Staunton Harold, on April 27. The choir has just been formed from among employees at Stanton Ironworks and it is expected that it will assist the band on many future occasions.

CHAMBERLAIN INDUSTRIES, LIMITED, Staffa Works, Staffa Road, Leyton, E.10, announce that they have introduced a part-exchange service which permits users of their portable 2-in. capacity two-stage hand-operated oil hydraulic tube-bending machines to exchange their existing pump and ram units for reconditioned units.

IT IS ANNOUNCED by F. A. Hughes & Company, Limited, London, that they have now fitted their cathodic-protection schemes embodying magnesium castings to the under-water hulls of over 130 ocean-going ships, and are receiving numerous new orders. One order is for a number of vessels for the Glasgow firm of H. Hogarth & Sons, Limited.

THE NATIONAL JOINT COMMITTEE ON MATERIALS HANDLING has compiled a list of films on materials handling which is now available upon receipt of a stamped addressed envelope, from the secretariat of the Committee, 20/21 Took's Court, Cursitor Street, London, E.C.4. Some 60 titles are listed showing the size and running-time (where known), the source of film and a brief synopsis of its purpose and audience suitability.

THE TWO MILLIONTH industrial type electric motor has been completed by Brook Motors, Limited, Huddersfield. A 200-h.p. motor in the larger range, it was part of a consignment of six drip-proof motors for shipment to Mexico. The first 1,000,000 industrial motors were completed in 46 years, the actual motor, made in 1950, being retained by the company. The second 1,000,000 has been completed in only seven and a half years.

THE INSTITUTION OF PRODUCTION ENGINEERS, in collaboration with the Society of Mechanical Engineers in Poland, arranged for an exchange visit between the two countries of groups of production engineers. The UK party left for Warsaw on April 27 and were to spend approximately 12 days touring Poland. The objective of the visit was to study manufacturing methods in various industries: the tour also included a visit to a Polish technical university.

STAGED JOINTLY by the Wolverhampton Productivity Association, the Wolverhampton and Staffordshire College of Technology and the United Kingdom Atomic Energy Authority an exhibition of nuclear power opened at the College on April 29. A "slave manipulator" installation by H. M. Hobson, Limited, Wolverhampton, showed a little-known aspect of the company's work in the atomic-energy field. The John Thompson Group also had a display.

AN ORDER has been placed with Boulton & Paul, Limited, Norwich, by the International Steel Company, Evansville (Indiana), US, for mechanical handling plant. The contract, worth £80,000, will be paid in dollars. James Archdale & Company, Limited, Birmingham, and Clifton & Baird, Limited, Johnstone, Scotland, are associated with Boulton & Paul in the manufacture of the plant, which uses push-button electrical processes to cut and drill steel bars without handling.

Mr. L. LAMPLUGH has been appointed sales engineer of the engineering department of Edgar Allen & Company, Limited, the Sheffield steelmakers. Mr. Lamplugh began his career as an apprentice draughtsman with Head Wrightson & Company, Limited, at Thornaby-on-Tees; he passed successively through all departments and was appointed technical manager in 1945. In 1947 he went to South Africa as a sales and contracts engineer for mining plant and machinery, returning to England in 1954 to become a sales engineer for mineral-dressing plant and equipment. He joined Edgar Allen & Company last November.

EKCO ELECTRONICS, LIMITED, and George Kent, Limited, are now offering joint services for the contracting, engineering, and manufacture of over-all instrument schemes for power and research reactors, following their close co-operation in the supply of complete instrumentation for four heavy water research reactors. George Kent is producing the physical instrumentation for various reactors, heat exchangers, and turbines, as well as recorders for the nucleonic instrumentation. Ekco Electronics has an extensive range of nucleonic control and health instrumentation and associated control circuitry.

THOMAS W. WARD, LIMITED, Albion Works, Sheffield, were judgment creditors for the sum of £547, when a petition for the compulsory winding up of Project Mayflower, Limited, which the Sheffield firm had made, was adjourned for a further six weeks on April 28. Mr. Bryan Clauson, for petitioners, said there appeared to be a possibility that the opposition to the petition would be withdrawn. Mr. Peter Oliver, for creditors, opposing the petition, said "salvage" was still proceeding smoothly. "The company's only asset is the replica ship. It is on display in the United States and is doing fairly well."

A NEW railway-freight express service, which began running from Sheffield on the night of April 21, will run daily with export goods from the city's industry and business to the Mersey ports of Liverpool and Birkenhead, ensuring early-morning delivery. It is additional to already existing services to Liverpool, and caters for full wagon-loads or lesser consignments made up into wagonloads. Sheffield already had an express freight service to the London docks. Now Sheffield Chamber of Commerce, which has been pressing for the Mersey service, is seeking a further express service to the Humber ports.

"CERTAIN SECTIONS OF LOCAL INDUSTRY, notably building, are suffering through the shelving of capital projects," said Mr. Henry Baker, retiring president of Rotherham Chamber of Commerce, at their annual meeting on April 28. "The great bulk of Rotherham's industry is still going all out," he added, "but unemployment, and more particularly short-time working, is increasing. If any redundancy does occur, I think it will be only in unskilled workers, for there is still a shortage of skilled labour." Mr. Baker said it was time that the rank and file trade unionists were made aware of the change in the economic climate.

IN RECOGNITION OF THE SERVICES of Lt.-Col. J. Reid Kerr, who until his recent resignation was

(*Continued on page 560*)

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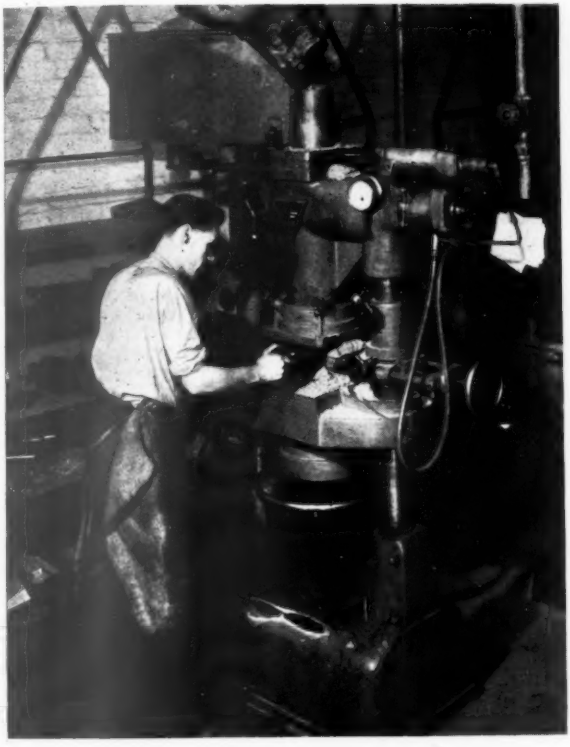

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Why not visit the International Fair at Liege where you can see the new designs of V & S Core Shooters and Shot Blast equipment on the Vogel & Schemmann stand No. 5313/15/17 in Palais 1. May 10th to May 26th.

We will be pleased to send you a free admission ticket on request.

METALS & EQUIPMENT (W'TON) LTD.

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News in Brief

(*Continued from page 558*)

chairman of the Renfrewshire Education Committee, the new trades college in Paisley is to be named the Reid Kerr College. The first part of the new college which cost approximately £300,000, will be opened to pupils in September. An extension, now at the planning stage, is to be added at an estimated cost of more than £250,000. On opening, the college will have accommodation for 1,750 pupils a week, but this figure will be increased to 3,000. Students will be apprentices working in central Renfrewshire and will attend one day each week.

FOLLOWING THE starting up of a fourth blast furnace, with a daily capacity of 1,400 tons of pig-iron, on January 14, the Koninklijke Nederlandse Hoogovens en Staalfabrieken N.V. (Royal Dutch Blast Furnaces and Steel Works, Limited), at Ijmuiden, opened a new oxysteel works on February 22. In this works, steel is manufactured by blowing substantially-pure oxygen on liquid pig-iron in a convertor, the productive capacity being 300,000 tons of steel a year. The third phase of the company's expansion programme will shortly be terminated with the opening of the electrolytic tinning line by Breedband N.V., which will eventually reach an output of 100,000 tons a year.

A NEW COMPANY which commenced operations on May 1, Research & Control Instruments, Limited, is the sole distributor in the United Kingdom of electronic instruments and scientific equipment previously marketed by the research and control instruments division of Philips Electrical, Limited. The new company is operating from 207, King's Cross Road, London, W.C.1 (telephone: TERminus 8444), and will assume full responsibility for the maintenance of existing Philips equipment. The company has stores and a service department at 49, Tamperley Road, London, S.W.12 (telephone: BATtersea 9166 and 9197). Mr. R. H. Cooke has been appointed a director and general manager of the company. He serves on the committee of the nucleonics section of the Scientific Instrument Manufacturers' Association, and is a founder member of the Society of Non-destructive Testing.

AT THE ANNUAL LUNCHEON of the Midland Region of the Federation of British Industries, held in Birmingham on April 17, Sir Hugh Beaver, president of the Federation, warned manufacturers that the economic climate over the whole world was changing and that the next 10 years would be a decade of keener selling, greater competition and narrower profit margins. Sir Hugh said that much depended on what happened in the United States where it was confidently expected that the autumn would see an end to the recession there. However, he continued, the position for Britain and the rest of the world was likely to be more difficult, although that was not to suggest that there would be anything in the nature of a world slump. Nevertheless, prices of raw materials and primary products had come down and the newly-emerged countries were over-reaching themselves in efforts to industrialize. At the same time the motor industry had shown what Britain was capable of doing and even in a world of increasing competition the UK could still hold and expand its position. Referring to the Government's intention to curtail the list of strategic export goods Sir Hugh said "It is difficult to see why we should restrict opportunities of increasing East-West trade." He concluded by saying that negotiations in Paris on the European Free Trade Area scheme had run into stormy weather but he believed that recent discussions which had been held with the Scandinavian countries, Austria and Switzerland might prove helpful.

Exhibition Briefs

The Production Exhibition, sponsored by the Institution of Production Engineers, is to be held at Olympia, London, from May 12 to 21. The times of opening are from 10 a.m. to 6 p.m. daily, with the exception of Sunday. Among the exhibits which are of interest to foundrymen the following may be mentioned:—

SMITH'S JACKING SYSTEMS LIMITED, will be exhibiting industrial hydraulic equipment, such as power-driven pumps, hand-operated pumps and hydraulic valves.

THE BRITISH TABULATING MACHINE COMPANY, LIMITED (*Stand* 15, *Row E*), will illustrate the development of electronic-machine employment by demonstrating production control with their Hec general-purpose electronic computer. In conjunction with this demonstration will be a display defining the functions of production control, under the headings of: programme breakdown, plant loading, progress control and stock control.

ADAPTA-CHARTS, LIMITED (*Stand* C.18), of Hammersmith Road, London, will show as their main exhibit an improved version of the Movigraph Rotadate wall chart. This comprises a number of interchangeable panels which slide between horizontal channelled sections. It is meant for charting processes or situations over an indefinite period. As time passes, panels which represent "dead" periods can be quickly replaced by those covering current ones. Also on the stand there will be examples of the standard "Movigraph" range of charts, covering such applications as machine loading, stock control, maintenance, progress, etc.

SHELL CHEMICAL COMPANY, LIMITED, will be exhibiting their range of "Epikote" resins and curing agents (*Stand* F13) in the "Production in Metals" section of the exhibition. The theme of the stand will be to show how the use of plastics materials instead of steel in many tooling applications in the engineering industry can cut costs in materials and labour. The exhibits will show how overall production costs can be reduced considerably by using these resins to make such tools as drilling jigs, checking fixtures, vacuum-forming moulds, press tools and foundry patterns. Their application will also be shown in the manufacture of "plastic metal" stopping compounds for use in general body work and filling of casting blow-holes, etc., in foundry work.

THE ZINC ALLOY DIE CASTERS' ASSOCIATION, of Berkeley Square, London, will stage a group display to which 13 members are contributing panels showing examples of die-castings typical of their products. The firms participating in this exhibit are:— Alloy Pressure Die Products, Limited, Birmingham Aluminium Casting (1903), Company, Limited, British Die Casting & Engineering Company, Limited, Dyson & Company, Enfield (1919), Limited, Fry's Diecastings, Limited, Gills Pressure Castings, Limited, George Goodman, Limited, Kaye Alloy Castings, Limited, Metal Castings, Limited, Arthur Shaw & Company, Limited, Sparklets, Limited, Strebor Diecasting Company, Limited, and the Wolverhampton Die Casting Company, Limited.

The end wall of the stand is a display on behalf of the Association as a whole and shows zinc die-castings of general interest, many of which can be handled and examined by visitors to let them see the quality of surface and the accuracy of detail available in pressure-die-cast zinc alloy.

Mon oncle est un homme

MY UNCLE IS A MAN

de très bon sens

OF VERY GOOD SENSE

Il aime beaucoup le

HE LIKES VERY MUCH HIS

Dubonnet et il dit toujours

DUBONNET AND HE IS ALWAYS SAYING

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Raw Material Markets

Iron and Steel

Sufficient pig-iron is being produced in all grades for current needs and stock requirements. For some irons, chiefly the high-phosphorus pig-iron, the tonnages available are more than sufficient to satisfy present demands. Blast-furnace capacity is not fully absorbed and production is governed in many instances by demand, while several furnaces are not operating on account of the decrease in the requirements of the ironfoundries and the steelworks. There are plentiful supplies of raw materials and stocks in hand are good. With the regular consignments which are being received, adequate supplies are available for consumption needs and to meet any possible increase in pig-iron demand. Basic deliveries to the steelworks enable them to obtain the required outputs of ingot steel.

Imports of iron from overseas have fallen appreciably, and the tonnages received against old contracts are surplus to requirements, as ample supplies, which could be increased if the demands warranted, are being received from home furnaces.

The call for pig-iron from the ironfoundries shows little variation. The biggest demand continues to come from the engineering and speciality foundries for low-phosphorus irons and fairly good tonnages of hematite and some refined irons are also being taken up by them. These are mostly being used in high-duty castings for the motor vehicle trade whose demands continue at appreciable levels. Many other trades, including power and electrical plant manufacturers, machine-tool and agricultural implement makers, steelworks, and collieries are also calling for good tonnages. The aggregate requirements enable the foundries to obtain good outputs. Outputs of the low-phosphorus irons are adequate, while hematite production is in excess of current needs and makers could undertake additional business. Refined iron is also easily obtainable.

The high-phosphorus pig-iron position remains quiet and demands are very moderate. Business at the light and textile foundries is fairly subdued, and many of the jobbing foundries are searching for more work. Forward buying is negligible and the orders for pig-iron which are being received are to cover actual work on hand. The foundries are well provided with scrap, foundry coke, ganister, limestone, and firebricks.

Business at the re-rollers, particularly in the English Midlands, is very quiet. Both the light and heavy mills are short of work and most establishments are working short time. The demand for small bars and light sections is very low and, for the heavier sizes, orders have declined appreciably in the last few weeks.

Ample supplies of steel semis are available, and the steelworks are finding it difficult to obtain sufficient tonnage for their rollings. Stocks of billets at the re-rollers are not being used up as rapidly as expected.

There is little, if any, call for defectives and crops which arise at the steelworks. It is probable, however, that some of the re-rollers would consider taking supplies if the price were more related to present conditions.

Non-ferrous Metals

There is little news in the copper market on either side of the Atlantic. The strike at Chuquicamata continues, so helping the undertone. Nothing decisive has emerged after first or second thoughts on the US proposal to subsidize domestic producers. The bullish argument runs that this would be a preferable alternative to tariffs, but again if the subsidy plan were adopted it would encourage increased production in the States. Meanwhile, buying in London is routine and slow in New York. The US custom smelter price is unchanged at 23¼ cents, as is the US producers' price of 25 cents a pound.

Tin is the main centre of attraction—mainly because the International Tin Council, at its meeting in London last week, decided to keep secret the details concerning the special fund recently created to help the buffer stock manager. M. Georges Peter, chairman of the International Tin Council, disclosed at a Press conference that when it was decided to restrict tin exports by 40 per cent., one of the basic assumptions was that countries not members of the international tin agreement would be exporting more metal this year. In the first two months of this year, Russian and eastern European exports of tin amounted to 3,100 tons, compared with 9,300 tons from the same sources for the whole of last year.

During the new three-month period of export restrictions beginning on July 1 there has been a reallocation of quotas. Thailand will be able to ship 1,920 tons, against 1,690 tons, and Nigeria will be able to ship 1,357 tons, against 1,228 tons. These two countries are the main beneficiaries in the new period when the total exports allowed will be 23,000 tons. The worst sufferer will be Indonesia, whose exports are cut by 445 tons, to 4,464 tons. Malaya's quota is unchanged at 8,625 tons, but the Belgian Congo quota is reduced slightly to about 2,050 tons. Bolivia will be permitted to export 4,580 tons, instead of 4,699 tons.

In general terms the council's meeting was considered satisfactory by the market, and the effect on prices was small. Meanwhile, although demand is disappointing, supplies are drying up, and it may not be long now before the expected rise in the price of tin takes place. In America the market is quiet, although the quotation is over 94 cents a pound.

Lead and zinc continues idle in London and New York, both metals being under the influence of the present controversy over subsidies and tariffs. In the States the price of lead is 12 cents a pound, and zinc 10 cents.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone: CHAncery 4411, ext. 738 or 771), unless otherwise stated.

NOTTINGHAM, May 17—Annual contracts for Water Department include cast-iron pipes.—Classes "C" and "D" (including ordinary sand-cast, sand-spun and spun-iron), special castings up to and including 6 in.—Class "CD.", special castings over 6 in.—Class "CD.", irregular special castings—Class "CD.", and miscellaneous iron castings. Documents from Mr. B. W. Davies, engineer and general manager, Water Department, Castle Boulevard, Nottingham.

RUSHDEN, May 30—Construction of approximately 85 yd. of 9-in. sewer and 150 yd. of 4-in. spun-iron rising main, together with all necessary ancillary works. Documents from the engineer and surveyor, Council Buildings, Rushden.

ALTON, May 14—Construction of approximately 180 lin. yd. of 6-in., 7-in., and 9-in. stoneware and spun-iron foul sewer and manholes. Documents from Mr. F. T. Cornhill, M.I.Mun.E., M.R.S.H., Council Offices, High Street, Alton, Hants.

DURSLEY, GLOS., May 12—Construction of approximately ½-mile of 5-in. cast-iron rising main, together with other works incidental thereto, at Coaley, Contract No. 4, for R.D.C. Documents from the engineers, A. P. T. Cotterell and Son, 54 Victoria Street, Westminster, S.W.1. Deposit £3 3s.

ROCHESTER, May 26—Provision and laying of approximately 100 lin. yd. of 4-in. dia. spun-iron pumping main, together with other ancillary works. Documents from City Surveyor's Department, 66 Maidstone Road, Rochester. Deposit £2 2s.

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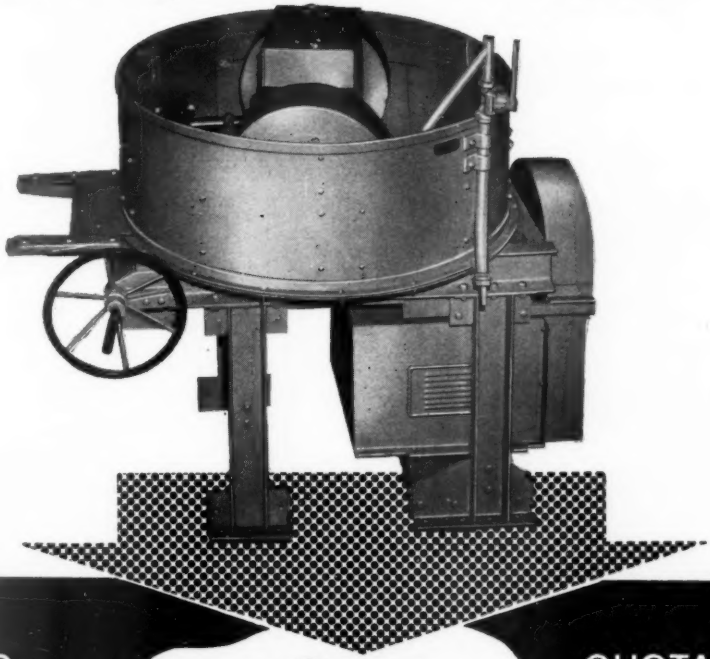

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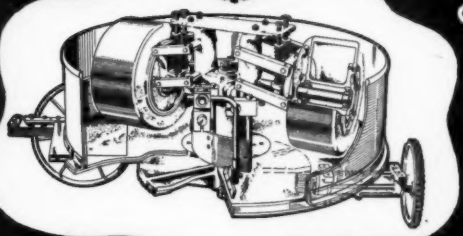

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Current Prices of Iron, Steel, and Non-ferrous Metals

(Delivered unless otherwise stated)

May 7, 1958

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £21 6s. 0d.; Birmingham, £20 18s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £23 17s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £24 1s. 3d.

Scotch Iron.—No. 3 foundry, £25 3s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £25 19s. 0d.; South Zone, £26 1s. 6d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £27 6s. 6d.; South Zone, £27 9s. 0d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. of England (local iron), £25 6s. 6d.; Scotland (Scotch iron), Zone S.1, £25 13s. 0d.; Sheffield, £26 15s. 0d.; Birmingham, £27 4s. 0d.; Wales (Welsh iron), £25 6s. 6d.

Basic Pig-iron.—£20 3s. 0d., delivered Staffs, Derbyshire, Notts, Lincs, Rutland, Northants, and Leics.

FERRO-ALLOYS

(Per ton unless otherwise stated, delivered)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £47 10s. 0d. to £48 0s. 0d., scale 17s. 0d. per unit; 75 per cent. Si, £67 0s. 0d. to £67 10s. 0d., scale 17s. 0d. per unit.

Ferro-vanadium.—50/60 per cent., 22s. 6d. per lb. of V.

Ferro-molybdenum.—65/70 per cent., carbon-free, 12s. 6d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., 2-3 per cent. Cu, £250 0s. 0d.; 38/40 per cent., commercially carbon-free, £287 0s. 0d.

Ferro-tungsten.—80/85 per cent., 7s. 11d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 10s. 11d. per lb. of W.

Ferro-chrome (6-ton lots and over).—4/6 per cent. C, £91 10s. 0d., basis 60 per cent. Cr, scale 30s. 0d. to 30s. 6d., per unit; over 6 per cent. C, £87 10s. 0d., basis 60 per cent. Cr, scale 30s. 6d. per unit; 2 per cent. C,* 2s. 1d. to 1½d. per lb. Cr; 1 per cent. C,* 2s. 1½d. per lb. Cr; 0.15 per cent. C,* 2s. 2½d. per lb. Cr; 0.10 per cent. C,* 2s. 2¾d. per lb. Cr; 0.06 per cent. C,* 2s. 3d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 7s. 2½d. to 7s. 9½d. per lb.

Metallic Manganese.—94/96 per cent., carbon-free, £265 0s. 0d.; 96/98 per cent., £295 0s. 0d.

Ferro-columbium.—65/72 per cent., Nb + Ta, 19s. 9d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £83 0s. 0d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft u.t., £32 15s. 6d.; tested, 0.08 to 0.33 per cent. C, £33 15s., 6d.; hard (0.41 to 0.60 per cent. C), £34 17s. 0d.; silico-manganese, £43 16s. 6d.; free-cutting, £36 14s. 6d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £41 1s. 0d.; silico-manganese, £44 4s. 0d.

* Average 68-70 per cent.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.33 per cent. C, £38 10s. 0d.; basic, hard, over 0.41 up to 0.60 per cent. C, £39 12s. 6d.; acid, up to 0.25 per cent. C, £43 4s. 0d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £42 2s. 0d.; boiler plates (N.-E. Coast), £44 12s. 0d.; floor plates (N.-E. Coast), £43 11s. 0d.; angles (N.-E. Coast), £39 16s. 6d.; joists (N.-E. Coast), £39 12s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in., and flats, 5 in. wide and under, untested soft basic, 50 tons and over: £40 0s. 6d; under 10 tons to 4 tons, £40 18s. 0d.; under 4 tons to 2 tons, £41 3s. 0d.; hoop and strip, coils, £39 0s. 0d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £44 16s. 0d.; black sheets (hand mill), 24g., £58 14s. 6d.; galvanized corrugated sheets, 24g., £66 16s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £68 10s. 0d.; nickel-chrome, £99 11s. 0d.; nickel-chrome-molybdenum, £111 19s. 0d.

NON-FERROUS METALS

Copper.—Cash, £177 15s. 0d. to £178 0s. 0d.; three months, £179 0s. 0d. to £179 10s. 0d.; settlement, £178 0s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 1s. 8¾d. per lb.; rods, 204s. 3d. per cwt. basis; 20 s.w.g., 237s. 0d. per cwt.

Tin.—Cash, £730 0s. 0d. to £730 10s. 0d.; three months, £733 10s. 0d. to £734 0s. 0d.; settlement, £733 10s. 0d.

Lead (Refined Pig).—First half May, £72 10s. 0d. to £72 12s. 6d.; first half August, £73 10s. 0d. to £72 15s. 0d.

Zinc.—First half May, £62 10s. 0d. to £62 12s. 6d.; first half August, £62 15s. 0d. to £62 17s. 6d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £97 0s. 0d.; rolled zinc (boiler plates), all English destinations, £94 15s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £85 10s. 0d.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 5¾d. per lb.; sheets to 10 w.g., 155s. 6d. per cwt.; wire, 2s. 3½d.; rolled metal, 155s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £130; B6 (85/15), — ; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £167; HTB2 (38 tons), £185; HTB3 (48 tons), —.

Gunmetal.—BS1400, LG2 (85/5/5/5), £154; LG3 (86/7/5/2), £164; G1 (88/10/2/½), £223; (88/10/2/1), £213.

Phosphor Bronze.—BS1400, PB1 (AID released), £240 per ton.

Phosphor Bronze Strip, etc.—Strip, 231s. 0d. per cwt.; wire, 3s. 6½d. per lb.; rods, 2s. 9¾d.; tubes, 2s. 9¾d.; chill cast bars: solids 2s. 10½d.; cored 2s. 11½d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 5d. per lb.; round wire, 10g. in coils (10 per cent.), 3s. 9¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 3s. 8¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 5½d. per lb. Antimony, English, 99 per cent., £190 0s. 0d. Quicksilver, ex-warehouse, £76 0s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £180 0s. 0d.; aluminium bronze (BS1400), AB1, £200; AB2, £217.

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Personal

Mr. F. O. ACKROYD has been appointed to the board of Crofts (Engineers), Limited, of Bradford.

Sir PETER ROBERTS, M.P., Mr. P. J. C. BOVILL, Mr. A. M. HOLBEIN and Mr. K. E. WALKER have been appointed to the board of Ransomes and Rapier, Limited. A successful offer for the capital of the company was made recently by Newton Chambers & Company, Limited.

Mr. GUSTAV O. HOGLUND, head of the welding section of the Aluminum Company of America Process Development Laboratory, has been elected president of the American Welding Society, and Mr. CHARLES I. MACGUFFIE, manager of marketing of the welding department of the General Electric Company, has been elected first vice-president.

Dr. W. W. EASTON, a lecturer at Bristol Technical Institute, Edinburgh, has been appointed principal of the new technical education college centre at Thurso which will train engineering apprentices for the Dounreay Atomic station. Dr. Easton, who is 39, is a lecturer in chemistry, chemical technology, engineering science, maths, and electricity, at Bristol Institute.

Mr. K. J. CLARKE, manager for the British Thomson-Houston Company, Limited, in the Sheffield district since October, 1957, has been appointed manager of the Birmingham district in succession to Mr. F. C. BARFORD, who has become manager of the small industrial machines department, Blackheath, Birmingham. Mr. Clarke, who has been in Sheffield since 1953, will be succeeded there by Mr. W. J. WILSON, manager of the Leeds district.

Brigadier T. CARLETON HARRISON has been appointed chairman of Gillette Industries, Limited, in place of Sir ERNEST COOPER, who remains on the board. Brigadier Carleton Harrison will continue as managing director, a position he has held since 1946. Mr. WILLIS C. COOPER has been appointed deputy chairman. Mr. CECIL ABDERHALDEN, formerly managing director of Gillette, Germany, and latterly area supervisor Germany, France, Switzerland and Italy, has been elected to the board of Gillette Industries and will act as deputy managing director.

The British Iron and Steel Research Association announces that Mr. S. S. CARLISLE, M.SC., head of the South Wales laboratories since February 1954, has been appointed head of the physics department at BISRA's Battersea laboratories. In addition he will continue to have an executive responsibility for the South Wales laboratory as deputy head of the mechanical working division (Swansea). He is to be succeeded at Sketty Hall by Mr. W. N. JENKINS, B.SC., of the electrical engineering section of BISRA's plant engineering division at Battersea. Both these new appointments are operative from July 1.

Mr. J. G. NEENAN has been appointed a director of Bradley and Foster, Limited, Bradleys (Darlaston), Limited, Bradleys (Concrete), Limited, and Arblaster & Company, Limited, Kings Hill, Darlaston. Mr. Neenan has been associated with Bradley and Foster, Limited, since leaving the Forces at the end of the second world war, taking the position of labour and transport manager. Later he was appointed production manager and ultimately general works manager. Another alteration in the directorate of the Bradley and Foster companies is the resignation from the board of directors of Arblaster & Company of Mr. ARTHUR ARBLASTER, who, with his brother, was the founder of the Arblaster undertaking. He is 77 years of age.

Mr. H. SMITH, works manager of Handley Page, Limited, is retiring after 40 years with the company but has accepted an appointment as consultant. Mr. E. W. PICKSTON, manager of Handley Page (Reading), Limited, relinquishes that post and is appointed works manager of Handley Page in succession to Mr. Smith. Mr. W. EAMES has been appointed assistant works manager and Mr. W. CORBETT, Radlett aerodrome superintendent in succession to Mr. W. Eames. Mr. D. C. ROBINSON, works superintendent, has been appointed chief engineer of the commercial division of Handley Page. Mr. E. MANLEY WALKER has been appointed a director and also manager of Handley Page (Reading); and Mr. J. WILKINSON has been appointed works manager Handley Page (Reading).

Obituary

Mr. JAMES WATSON MCGILVRAY, managing director of the Glasgow Expanded Metal Company, Limited, died on April 21.

Mr. HENRY CLIFFORD SAYNER, commercial manager of F. Parramore & Sons, Limited, ironfounders and engineers, Chapeltown, Sheffield, died on April 29 at the age of 52.

The death has occurred at the age of 68 of Mr. LEONARD SOLLIS, formerly managing director of Highfield Gear and Engineering Company, Limited, Huddersfield.

The death has occurred of Mr. WILSON CUTTS, a foreman coremaker, and skilled iron moulder, at the Staveley Iron and Chemical Company, Limited, for more than 40 years until his retirement in 1942.

Mr. ANDREW MACKIE HAGART, whose death is announced, was managing director of African Explosives & Chemical Industries, Limited. He made a notable contribution to the development of that concern and to the development of the South African Iron & Steel Industrial Corporation, Limited, and the Electricity Supply Commission.

The death occurred on April 27 of Mr. PETER HAIG MUIRHEAD, who retired in January as managing director and general manager of Vickers-Armstrong (Engineers), Limited, because of ill-health. He was 53. Mr. Muirhead joined Vickers as an apprentice at the firm's Coventry ordnance factory, and became managing director of the engineering division in 1953. He had also been general manager of the Barrow shipyard and engineering works, director in charge of the Walker Naval Yard, and a director of Palmers Hebburn Company, Limited, shipbuilders, of Hebburn (Co. Durham). He was a past president of the North-East Coast Engineering Employers' Association.

Mr. THOMAS PATTERSON CARGILL, who, as was reported last week, died recently at the age of 85, was a former chairman of the Anderston Foundry Company, Limited, Middlesbrough. Mr. Cargill joined the Glasgow works of the company in 1906 as general manager. In 1920 he was elected to the board, and on being appointed managing director in 1927 he took up residence in Middlesbrough. He retired from active management in 1938 but continued as a member of the board and became chairman in 1946. Although he resigned from the chairmanship in 1954 he continued as a director until his death. When at the Glasgow works, Mr. Cargill was an active member of the Scottish Ironfounders Association and was chairman of the Association before his removal to Middlesbrough. (The company's Glasgow works closed down in 1930.)

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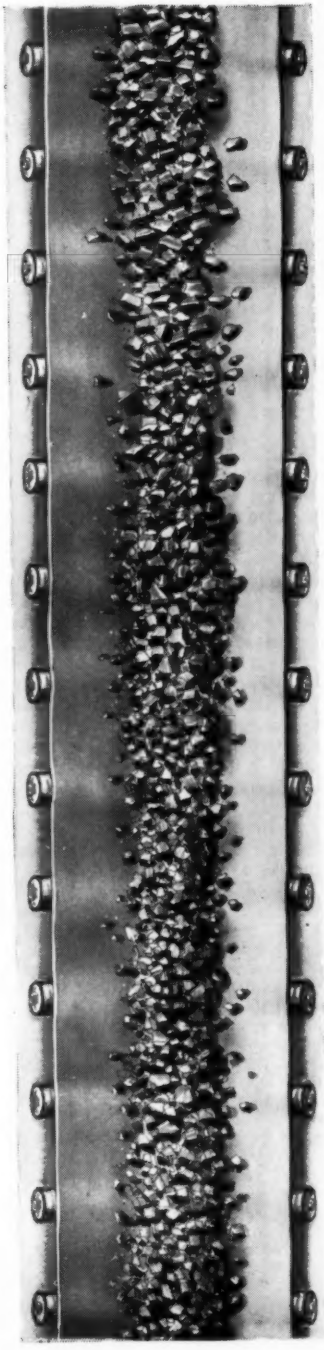

Metallurgical Abstracts

"Grain Size of High-speed Steel—the Effect of Reduction." R. F. HARVEY. (*Steel Processing and Conversion.* 1958. Vol. 44; No. 1; pp. 33-4.) There are at least four factors which affect the austenitic grain size in high-speed steel, namely: (*1*) hardening temperature; (*2*) hardening time; (*3*) composition; and (*4*) character and distribution of the undissolved carbides. Also, the amount of reduction in producing the bar from the ingot has a profound effect on the grain size, and this can be related to the distribution of the undissolved carbide. Fine carbides in large numbers are effective in inhibiting grain growth. The carbide particles are thought to exert an obstructing effect and restrict the orientation of a particular grain to prevent its absorption by a favourably orientated larger grain.

The M.10 molybdenum high-speed steel (C, 0.88; Mn, 0.30; Si, 0.30; P, 0.025 maximum; S, 0.025 maximum; Cr, 4.05; V, 2.05; Mo, 8.0 per cent.) shows more pronounced differences in grain size with increased bar size than similar high-speed steels with tungsten. To investigate the effect of bar size and the amount of reduction on the intercept grain size, a series of billets and bars from the same heat of M.10 were made with varying amounts of reduction. Discs from annealed bars were hardened at three temperatures—1,177, 1,205, and 1,231 deg. C.—in a controlled-atmosphere furnace. In every case specimens were taken at the mid-radius and at a cross section for grain-size determination. The large grain size which results with insufficient reduction is due to carbide segregation which is more pronounced with the large-bar sizes.

Smaller-bar sizes have a more adequate carbide distribution which is effective in restricting grain growth. The grain size of hardened high-speed steel is not entirely a heat characteristic but depends on the amount of reduction from ingot to bar. The smaller bars, with the greatest reduction, will generally have the finest grain size.

An Electric Signaller Reduces Quench Cracking of Steel. P. M. UNTERWEISER. (*Iron Age,* 1957. Vol. 180; No. 22; pp. 79-81.) This instrument responds to changes in magnetic permeability, as when austenite transforms to martensite. To detect such changes, an electronic coil is immersed in the quenching tank. Two model signallers have been built, one unit, for laboratory or tool room use, operating at a frequency of 60 cycles per sec., and the other at 0.75 cycles.

The first unit is used for parts up to 2-in. dia. and 8-in. long in a 50-gal. quenching tank, while the latter can handle parts up to 10-ft. long in a 1,800-gal. tank. Changes in ferro-magnetism can be detected at a distance, so there is no need to make contact with the part or interfere with the quenching action. The signaller used to control the quenching of laboratory samples has a driven coil coupled inductively to two pick-up coils.

When a piece of steel enters the field at the top of the tank, cooling promotes martensite formation. Since the martensite is ferro-magnetic, it creates an unbalanced voltage which is amplified and actuates the remainder of the circuit. A small cathode-ray oscilloscope, incorporated in the instrument, is used to obtain initial balance. An extra coil permits the balancing of eddy-currents. The tank is provided with running water, flowing at a rate of 12.5 gal. per min.

Only the top half of the tank can be used for quenching, as the presence of a steel part in the bottom half causes eddy-current unbalance in the wrong direction. The production-size signaller, operating at a low frequency, reduces magnetic "skin effect" and detects martensite at a greater depth below the surface. After a number of tests, the signaller was found to be sufficiently sensitive under different conditions of water flow, water temperature, and location of work in relation to the detecting coil in the quenching tank. These tests were of a preliminary nature, and now that the adequacy of the instrument's sensitivity and reproducibility has been established, the next step will be an evaluation of the usefulness of a signaller in reducing quench-cracking.

Pickling Stainless Steel for the Removal of Scale. W. E. MCFEE. (*Steel,* 1957. Vol 141; No. 22; pp. 103-7.) Scale adheres tightly to stainless steel and is more difficult to remove than that on carbon steel. Two basic methods of removal are: (*i*) mechanical (sand-blasting and tumbling), and (*ii*) chemical (pickling in acid solutions). When stainless steels are cleaned by shotblasting, they also should be chemically cleaned in a nitric-hydrofluoric acid solution. When scale is heavy and the parts permit, it is useful to tumble before the scale removal, which eliminates much of the brittle top scale and cracks the layers underneath.

A heated sulphuric-acid solution is the conventional step in scale removal, being satisfactory on light or moderately heavy scale. Pickling times should be kept as short as possible when using sulphuric acid. Alkaline solutions and molten caustics shorten the pickling time and reduce metal loss. When the scale is difficult to remove, an alkaline-oxidizing treatment should be included. Final scale removal and whitening are done in a solution containing 6 to 15 per cent. nitric acid by volume and 0.5 to 1.5 per cent. hydrofluoric acid by volume, this being followed by a water rinse. For Cr-Ni grades, the bath should be maintained between 43 and 60 deg. C. The operating time may vary from 2 to 30 minutes.

High-carbon stainless steels should not be pickled in the fully hardened condition, but should be stress-relieved after hardening and before pickling. The austenitic chromium-nickel and ferritic chromium steels are not susceptible to hydrogen embrittlement from exposure to reducing acids, but hardenable stainless steels when fully hard sometimes may be embrittled. To clean Cr-Ni and non-hardenable chromium steels, they should be immersed for 15 to 30 minutes in a solution containing 10 to 40 per cent. 40 deg. Be nitric acid by volume at 50 to 60 deg. C., and this followed with a water rinse.

Steam lines immersed in the acid increase the speed of pickling by keeping the heated fresh acid solution in constant contact with the stainless surface. Agitation set up by this treatment also helps in the removal of the loose scale. The author gives details of seven acid treatments for stainless steel scale removal.

Plastics (Epoxy Resins). Furane Plastics Inc., 4516, Brazil Street, Los Angeles 39, California, USA, have issued a four-page catalogue entitled "Plastics Tooling with Epocast." It shows *inter alia* the use of this range of materials for the making of fixtures for aeroplane components, together with much other interesting information.